Chapter 3

Affected Environment

3.1 INTRODUCTION

This chapter includes a description of the environment and resources with potential to be affected by the Alternatives described in Chapter 2. It provides the environmental resource baseline information for comparing potential impacts from the Proposed and Alternative Actions, which are analyzed in Chapter 4.

The resource elements used to describe the affected environment, as presented in this section, were identified as appropriate for this specific EA following interdisciplinary team review of the scope, issues and assessment procedures necessary to ensure accurate and comprehensive scientific analysis (BLM Utah NEPA Guidebook 2004). Resources that were identified and carried forward for analysis in this planning effort and those dismissed from further analysis, are also addressed in **Appendix A**. The following resources were determined to not be affected by the Proposed Action and No Action Alternatives: wild horses and burros, paleontology, cave and karst resources, comprehensive trails and travel management, lands and realty, coal and oil shale, fluid minerals, locatable/mineral material/non-energy leasable minerals. No further analysis of these resources will be included in this EA.

The CEQ guides federal regulations to reduce paperwork by incorporating by reference when appropriate. Therefore, the affected environment sections of the LUPs to be amended, along with any supplements or documents tiered to them, are incorporated by reference into this document. Those LUPs are listed by name and completion date in **Table 1.2** in Chapter 1.

3.2 GENERAL SETTING

Four of the major physiographic provinces of the western United States extend into the Utah planning area. These provinces include the Basin and Range, Rocky Mountain, Colorado Plateau and a small portion of the Snake River-Columbia Plateau province (Greer et al. 1981). Elevations in the planning area range from 2,350 to 13,528 feet above mean sea level. Most of the planning area is located between 2,500 to 7,500 feet above sea level.

Climatic regions throughout Utah can be classified under four climate types—desert, steppe, humid continental-hot summer and undifferentiated highlands. Each has distinct weather patterns, temperatures and precipitation patterns (Pope and Brough 1996). Elevation, latitude, distance from principal moisture sources (Pacific Ocean and Gulf of Mexico), location with respect to storm paths over the intermountain region and proximity to western mountain ranges help create the varied climate types (Garwood 1996). Precipitation varies from an average of less than five inches per year (Great Salt Lake Desert) to more than 60 inches per year (northern Wasatch Mountains). The average annual precipitation in the major agricultural areas of the state ranges between 10 to 16 inches (Pope and Brough 1996).

The planning area is comprised of approximately 19 million acres of public lands in Utah (**Table 1.1**). The planning area represents approximately 35 percent of all lands in Utah and 82 percent of BLM-administered land in Utah.

3.3 FIRE ECOLOGY

The way fire relates to vegetation is important because of the many ways it influences other resources. More than 80 percent of the vegetation resources on BLM-

administered lands in Utah are dominated by salt desert scrub, sagebrush, grasslands, pinyon and juniper woodland, blackbrush and some of the most important fire-related ecological issues center on these communities. Two of the largest issues are loss of shrubland and grassland communities to juniper encroachment and expansion of invasive plant species such as cheatgrass.

Historically, fire has played an essential role in the landscape by regenerating and maintaining a diverse mosaic of healthy ecosystems in riparian areas, grasslands, shrublands, woodlands, and forests. However, over the past century, fire ecology and the dynamics of successional processes have been altered. This has resulted in the simplification of vegetation mosaics, both on a community and landscape level.

The historic fire regimes in Utah varied in frequency and severity depending on vegetation type, climate and topography. Frequent fire return intervals created fire-adapted vegetation communities such as grasslands, sagebrush and ponderosa pine. However, for other vegetation communities, frequent wildfire was not part of their ecology because the return intervals were hundreds of years (Paysen et al. 2000). In these communities, the spatial distance between shrubs was too great to carry fire until plant growth filled enough inter-shrub spaces to carry it. Salt desert scrub, blackbrush and creosote and bursage are examples of native plant communities with longer fire return intervals.

Wildfire occurrence drastically decreased in Utah as settlers began to suppress fires and use the land in new ways. The exclusion of fire as a dominant ecological factor, in combination with other land management practices, has caused changes in the composition and structure of vegetation communities. For example, a change in the historic fire regime (e.g., longer fire return intervals) is likely responsible for the dramatic expansion of juniper into former sagebrush and grasslands types (Miller and Wigand 1994).

Non-native invasive species have become well established in the Intermountain West. Expansion of non-native species, such as cheatgrass, has greatly altered the fire ecology of certain low-elevation vegetation communities and, in some areas, threatens to convert large areas of native vegetation to near monocultures of cheatgrass-dominated annual grasslands. Cheatgrass grows and cures early in the season and provides a fine fuel that remains flammable for longer periods compared to native vegetation.

There were a total of 5,195 wildfires on BLM-administered lands within the Utah planning area between 1983 and 2003, approximately 80 percent of which were caused by lightning. Approximately 76 percent of these fires were less than five acres in size and approximately 67 percent were less than one acre in size. The largest fire (185,000 acres) during this time frame was in 1983. Even considering that figure, approximately 70 percent of the 10 largest fires have occurred between 1993 and 2003.

Considerable resources are required to protect humans, as well as natural and cultural resources, from the harmful effects of fire. Increased fuel loading due to fire suppression, greatly affects wildfire severity and intensity. Various fuel treatments, including prescribed fire, mechanical, chemical, seeding and biological treatments can be used to improve vegetation conditions by controlling woody plant invasion and the buildup

of fuels. After implementation of these fuels reduction treatments, proper rehabilitation is often essential to deter the establishment of weeds and to reduce soil erosion.

Fire Regime Condition Class (FRCC) is an interagency, standardized tool for determining the degree of departure from reference condition vegetation, fuels and disturbance regimes. Assessing FRCC can help guide management objectives and set priorities for treatments. FRCC was assigned to vegetation on public lands within the state through review of cover types identified by Utah GAP Analysis (Edwards et al. 1996) and elevation ranges. Definitions and descriptions of Fire Regimes and Fire Regime Condition Classes can be found in **Appendix D**. The resulting acreages are presented in **Table 3.1**. Many BLM Field Offices have completed more thorough FRCC assessments on a smaller scale using local resource knowledge and data. Field Office FRCC assessments would become part of future FMPs and implementation measures associated with fire planning.

Table 3.1 Approximate FRCC Acres for BLM Land in Planning Area*

FRCC	Description	Acres
1	Within the natural (historical) range of variability of vegetation characteristics; fuels composition; fire frequency, severity and pattern; and other associated disturbances.	40,000
2	Moderate departure from the natural (historical) range of variability of vegetation characteristics; fuels composition; fire frequency, severity and pattern; and other associated disturbances.	3,100,000
3	High departure from the natural (historical) range of variability of vegetation characteristics; fuels composition; fire frequency, severity and pattern; and other associated disturbances.	14,000,000
* Approximately 1,000,000 acres are considered historically non-vegetated and have no FRCC assigned.		

3.4 CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT AND OTHER RESOURCES BROUGHT FORWARD FOR ANALYSIS

3.4.1 Air

An activity that impacts air quality has the potential to also affect the air quality of the airshed where the activity is conducted. The potential exists for those impacts to extend to other airsheds as well. "Airshed" is defined as a geographic area, usually with distinct topographic features such as a valley, associated with a given air supply. Sixteen airsheds have been identified within Utah. In many cases, airsheds are shared with adjacent states.

The EPA air quality permitting system suggests that the analysis of air impacts should consider all areas within 100 kilometers (62.1 miles) of proposed projects within a planning area that may affect air quality (EPA 1992). To be consistent with this directive, the area of consideration for air quality impacts includes airsheds over lands within the planning area as well as lands within a 100-kilometer radius of the state of Utah.

3.4.1.1 Air Quality Standards

Air quality within the planning area is governed by federal laws, which the state of Utah has been given authority from EPA to administer. The framework for the Utah Air Quality Program is based on the Federal Clean Air Act (CAA) of 1970, as amended. Air quality within Utah is regulated by the Utah Division of Air Quality (UDAQ) within the Utah Department of Environmental Quality (UDEQ). Administrative rules governing air quality are found in the Utah Administrative Code R307, including emissions standards for general burning (R307-202); smoke management (R307-204); fugitive emissions and fugitive dust (R307-205); and requirements for specific locations such as Salt Lake, Utah, Weber and Davis Counties (R307-300 Series).

National Ambient Air Quality Standards (NAAQS) are defined in the CAA as levels of pollutants high enough to have detrimental effects on human health and welfare. The EPA established NAAQs for six criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), lead (Pb), sulfur dioxide (SO2) and categories of particulate matter; fine particulates with an aerodynamic diameter of 10 micrometers or less (PM10) and fine particulates with an aerodynamic diameter of 2.5 micrometers or less (PM2.5).

When criteria pollutant levels exceed ambient air quality standards, the area may be designated as a non-attainment area (NAA). It is possible for a geographic area to be an attainment area for one criteria pollutant and a non-attainment area for another. If an area falls into a non-attainment status, the State is required to prepare a State Implementation Plan (SIP) to describe how the area will be brought into attainment status. A SIP has been developed by the UDAQ for NAAs within Utah (UDAQ 2004a) and promulgated in UAC R307-110 (by reference).

Another provision of the CAA is the Prevention of Significant Deterioration. There are different permissible increments for criteria pollutant emissions for different areas (termed "Classes"). Class I comprises the following areas:

- International parks
- National wilderness areas that exceed 5,000 acres
- National memorial parks that exceed 5,000 acres
- National parks that exceed 6,000 acres
- National wildlife refuges and national wild and scenic rivers that exceed 10,000 acres
- All other areas of the state have been designated as Class II. There are no Class III areas that have been designated in Utah.

Class I areas are the most protected, having the least allowable degradation of air quality. In addition, 1999 amendments set forth a national goal for visibility. The rule, referred to as the Regional Haze Rule, calls for states to establish goals and emission reduction strategies for improving visibility in all mandatory Class I area national parks and wilderness areas. Utah's Regional Haze SIP has been adopted as Section Twenty of the State's existing SIP and is promulgated in UAC 307-110-28 (UDAQ 2004b).

In cooperation with other federal land managers, states and tribes, the U.S. Environmental Protection Agency (EPA) issued the Interim Air Quality Policy on Wildland

and Prescribed Fires (April 1998). One of the goals of the Policy is to allow fire to function as a disturbance process on federally managed wildlands while protecting public health and welfare.

Any smoke emissions resulting from annual prescribed burning projects or treatments within the planning area are conducted and managed in compliance with guidelines found in the Utah Smoke Management Plan (SMP) and interagency group program. Active group participants include various federal and state agency land managers, as well as the UDAQ. The purpose of this program and the SMP is to ensure that mitigation measures are taken to reduce the impacts on public health, safety and visibility from prescribed fire and wildland fire used for resource benefits. Utah submitted the SMP to the EPA in 1999 and received certification for the plan under the Interim Air Quality Policy on Wildland and Prescribed Fires (Utah Interagency Smoke Management 2004).

Compliance with the SMP is the primary mechanism for land managers to implement prescribed burns while ensuring compliance with the CAA. Burn plans written under this program include actions to minimize fire emissions, exposure reduction procedures, a smoke dispersion evaluation and an air quality monitoring plan. Proposed burns are reviewed on a daily basis by the program coordinator and burns are approved or denied based on current climatic and air quality conditions.

3.4.1.2 Air Quality Non-Attainment Areas

Six NAAs (and their associated NAA criteria) have been designated within Utah:

- Salt Lake County PM10
- Utah County PM10
- Salt Lake County SO2
- Ogden PM10
- East Tooele County SO2
- Provo/Orem CO

In addition, the Portneuf Valley and Fort Hall PM10 NAAs located in southeastern Idaho, and the Las Vegas, Clark County, Nevada CO, ozone, and PM10 NAAs are within the 100 kilometer area of consideration.

Several places within the planning area that were previously designated as NAAs have been re-designated as maintenance (or attainment) areas. These areas include the Davis and Salt Lake County O3 maintenance areas and the Ogden City and Salt Lake City CO maintenance areas.

As noted in the previous section, a SIP has been developed to address the designated NAAs within the state. Where a NAA has been re-designated a maintenance area, the corresponding SIP section is revised as a maintenance plan to ensure that air quality will remain in compliance for at least 20 years.

3.4.1.3 Sensitive Areas

Areas that have been identified as sensitive to air quality include locations such as NAAQs non-attainment areas, Class I areas, hospitals, airports, major transportation corridors, and population centers. There are five mandatory Class I areas currently designated within Utah (EPA 2002). These include Arches National Park, Canyonlands

National Park, Bryce Canyon National Park, Zion National Park and Capitol Reef National Park. There are also portions of two mandatory Class I areas identified within the hundred kilometer area of consideration. These include Grand Canyon National Park in Arizona and Mesa Verde National Park in Colorado.

There are several major transportation corridors that run through Utah and the area of consideration. They include U.S. Interstate 15, U.S. Interstate 70, U.S. Interstate 80, U.S. Interstate 84 and U.S. highways. Numerous airports are located throughout Utah and the surrounding area of consideration. The largest airports are Salt Lake City International Airport and Hill Air Force Base. There are also numerous hospitals and medical centers within the planning area, generally located in larger population centers. Local community events and national holidays should also be considered during planning of prescribed fire activities due to public sensitivity, as well as air quality impacts due to regularly occurring community events (such as fireworks).

3.4.2 Soil And Water

3.4.2.1 Soils

Soils on BLM-administered lands have developed from bedrock, rocks, and minerals deposited by rivers and glacial activity, windblown silt and sand. They are derived primarily from the sedimentary, metamorphic and volcanic rocks of the mountain ranges and highlands. The weathered substrate from these source materials has chemical and physical characteristics that favor certain vegetation types and combined with climatic influences, it can provide a specific habitat niche for rare plant species. Soil source materials or substrates found in the planning area fall into the following types: alluvium, calcareous, clay, conglomerate, dolomitic, duff, granitic, gravelly loam, gypsiferous, igneous, limestone, loam, quartzite, sandstone, sandy and shale. The magnitude of erosion/sedimentation; types and amounts of clay minerals and organic matter strongly influence the ability of soils to capture nutrients released through burning.

Soils located on the eastern Great Basin were also formed by old lakebed and shoreline deposits from Lake Bonneville. The lakebed deposits consisted of clay, silt, and some sand and gravel. A great portion of the "West Desert" mountains include the shoreline of prehistoric Lake Bonneville and include playa deposits of saline evaporates and mud flat or dune deposits.

The presence of biological crusts in arid and semi-arid lands influences the soil environment by reducing soil erosion (from both wind and water), fixing atmospheric nitrogen, retaining soil moisture and providing living organic surface mulch. This crust consists of a variety of cyanobacteria, green algae, lichens, mosses, microfungi and other bacteria (Belnap et. al. 2001). A crust's development is strongly influenced by soil texture, soil chemistry and successional colonization by crustal organisms. The type and abundance of biological crusts can be used to determine the ecological history and condition of a site. In some ecosystems, such as those characterized by highly erosive marine sediments and little vegetative cover, physical crusts such as vesicular chemical crusts and desert pavement can also provide protection from wind erosion.

EROSION AND RUN-OFF

Factors determining erosion potential include slope, soil type and vegetative cover; areas with steep slopes, low infiltration rates and minimal vegetative cover have the highest erosion hazard. Certain geological formations, such as the Mancos-shale, tend to form soils that are highly erosive. The hazard for soil erosion by water and wind is rated in the County level soil surveys conducted by the National Resource Conservation Services (http://soildatamart.nrcs.usda.gov/State.aspx?State=UT).

Many soils throughout Utah have features that make reclamation and revegetation difficult. These limiting features involve salinity, sodium content, clayey and sandy textures, drought conditions, alkalinity, low organic matter content, shallow depth to bedrock, stones and cobbles, and high wind erosion potential.

SOIL QUALITY AND HEALTH

The capacity of a soil to sustain plant and animal productivity is related to its inherent physical, biological and chemical properties as well as its current health or condition. There are three key attributes of soil health, each with measurable indicators to help determine the status or health of a site. Site stability relates to the ability of the soil to resist erosion (and loss of nutrients) by wind and water. Hydrologic function is the capacity of the site to capture, store and safely release water from rainfall and snowmelt. Biotic integrity is the capacity of a site to support both functional and structural plant, animal and soil biological communities within the range of variability for that site (BLM Technical Reference 1734-6 2000).

Information regarding soil quality is generally obtained from Rangeland Health Assessments, Burned Area Emergency Rehabilitation and Restoration Assessments, watershed assessments/analyses, and similar field assessments or historical records of disturbance in proposed project areas. This type of data is not compiled or available at a statewide level. These assessments are generally conducted during project planning and used to develop appropriate mitigations, rehabilitation, and other soil protection measures.

3.4.2.2 Water

SURFACE WATER

Surface water systems vary throughout Utah due to climate, geology, topography and human activities. Utah's surface water resources include 14,250 miles of rivers and streams and nearly 3000 lakes and reservoirs (UDEQ 2002). The major watersheds in the state are the Colorado and Green Rivers, which drain the eastern extent of the state; the Great Salt Lake drainage in the northern portion of the state; and several smaller drainages that drain the central portions of Utah into internal closed basins (Sevier River and Cedar/Beaver River) (UDEQ 2004). The BLM manages a substantial amount of land throughout all of these watersheds. Many areas within the watersheds—including riparian, wetland and floodplain zones—are sensitive to vegetation and soil disturbances associated with fire and fire management efforts.

Approximately 49 percent (8.2 million acres) of the total lands in the Colorado/Green River watershed is administered by BLM. Subdrainage systems include the Virgin, San Juan, Price and Duschene Rivers. Most of the water supply to this watershed comes from snowmelt during the spring and early summer months and precipitation from high-

intensity convective storms throughout the spring, summer and fall. There are also many ephemeral drainages throughout the watershed that flow intermittently during the year. The primary water use in the watershed is agricultural with increasing amounts being used to supply the growing residential water demands in the state.

Approximately 31 percent (5.4 million acres) of the total lands in the Great Salt Lake Basin watershed is administered by BLM. The primary rivers through this watershed include the Bear, Provo, Weber and Jordan. Most of the water supply in these streams comes from snowmelt in the Wasatch Mountains in the spring and early summer. Many ephemeral streams occur in this dry region and tend to flow intermittently following large-scale precipitation events. The water in the watershed is used for municipal, industrial, agricultural and recreational purposes.

Approximately 42 percent (3 million acres) of the total lands in the Sevier River watershed and 54 percent (1.9 million acres) of the total lands in the Cedar/Beaver Rivers watershed are administered by BLM. Most of the surface water runoff comes from snowmelt during the spring and early summer months. Tributary streams peak at different times depending on the watershed aspect, elevation and configuration. The Sevier River's water resources are heavily used for irrigation. The Beaver River and its tributaries provide most of the water in the Cedar/Beaver River watershed. Most of the surface water runoff comes from snowmelt during the months of April, May and June. Many normally dry drainages experience high-volume, short-duration flood flows produced by high intensity convective storms throughout the spring, summer and fall. The primary use of water is for irrigation.

GROUNDWATER

Most of the groundwater that is suitable for irrigation, public supply or industrial use comes from the north-south central corridor through the state (Burden et al. 2003). These primary recharge areas generally occur along mountain fronts where basin-fill materials erode from mountain bedrock (Baskin et al. 2002). Groundwater accumulates in these areas and flows downstream. Further away from the mountain fronts, groundwater discharge areas occur where groundwater collects (e.g., to form playas) or flows to surface water bodies.

Groundwater recharge areas are vulnerable to surface sources of pollution because groundwater movement is typically pulled downward by gravity and primary recharge areas do not have protective, fine-grained layers that serve to filter out the pollutants. In addition, groundwater is naturally sensitive to total dissolved solids in certain bedrock types. Additional factors that contribute to total dissolved solids in groundwater include burned areas and areas with irrigation return flow. Burned areas are more susceptible to erosion, delivering minerals to recharge areas. Irrigation return flow is concentrated through evaporative losses, leading to higher salinity concentrations.

WATER QUALITY

Water within Utah is used for domestic, recreational (including primary contact—e.g. swimming and secondary contact—e.g., boating), aesthetic and agricultural reasons. It also is habitat for aquatic and water-oriented wildlife and fish. In Utah, approximately 73 percent of streams (by mileage) and 69 percent of lakes (by acreage) fully support beneficial uses; 15 percent of streams and 31 percent of lakes partially support

beneficial uses; and 12 percent of streams and less than one percent of lakes do not support at least one beneficial use (UDEQ 2002).

Several streams in Utah have been identified as "water quality impaired," as defined in the Clean Water Act, Section 303(d). The major causes of water quality impairment in streams are habitat alterations caused by and in addition to, heightened levels of total dissolved solids, nutrients and sediment. The sources of these impairments come predominantly from agriculture (e.g., grazing, irrigation); natural stockpiles (e.g., bedrock); on-the-ground hydrological modification (e.g., resource extraction and road construction); and point-source discharges. The major causes of water quality impairment in lakes and reservoirs are siltation; high levels of nutrients, suspended solids and organic matter; low levels of dissolved oxygen; and encroachment of noxious aquatic plants. Sources of these impairments include agricultural practices, industrial and municipal point discharges and hydrological modification (UDEQ 2002).

Groundwater quality is classified by the Utah Water Quality Board based primarily on the total amount of dissolved solids in the water: the lower the total dissolved solids, the higher the water quality. Groundwater quality classifications are used to protect higher quality water through more stringent land use planning. Accordingly, when a stream is listed as impaired, Total Maximum Daily Loads (TMDLs) of dissolved solids in the water must be identified and documented for surrounding watersheds. TMDLs include point and non-point sources (UDEQ 2004b).

3.4.3 Vegetation

Table 3.2 shows 11 native vegetation cover types on BLM-administered land in Utah as summarized from GAP analysis. An additional vegetation type is dominated by cheatgrass: a non-native invasive species. As elevation increases, vegetation types transition from range communities dominated by grasslands and shrublands to pinyon and juniper woodland, mountain brush and aspen at mid-elevations and conifer forests at upper elevations. Riparian types bisect the otherwise arid landscape, typically occurring as narrow stringer communities along the various watercourses throughout Utah. The cheatgrass-dominated community generally occurs at lower elevation areas (<6,500 feet). The geographic areas where the vegetation cover types occur are represented on **Figure 3.1**.

Wildfire in many of Utah's vegetation communities was a regular occurrence that helped define species composition, structure and productivity (Bradley et al. 1992, Paysen et al. 2000). As such, many plants that make up these communities are adapted to withstand wildfire. Grasslands, sagebrush, mountain shrub, aspen and mixed conifer forests are examples of fire-adapted communities in Utah. In contrast, frequent wildfire is not part of the normal ecology of other vegetation communities with long fire return intervals such as salt desert scrub and blackbrush which typically are not dominated by fire adapted species (Paysen et al. 2000). Fire in these communities is generally viewed as detrimental because plant succession may require decades to centuries for the vegetation to recover; some species may never recuperate.

Table 3.2 Consolidated Vegetation Types

Vegetation Type	Utah GAP Analysis Vegetation Cover and Fire Regime	Planning Area Acres	% Total Planning Area	% Historic Expanse in Planning Area* (est)	FRCC and Acreage by Category
Salt Desert Scrub	Salt Desert Scrub (V) Greasewood (V)	5,357,816	29	30-35	FRCC 1- 0 FRCC 2- 0 FRCC3-5,357,816
Pinyon and Juniper Woodland	Pinyon and Juniper (II) Pinyon (II) Juniper (II)	4,730,737	26	<5	FRCC 1- 0 FRCC 2- 946,147 FRCC3-3,784,590
Sagebrush	Sagebrush (II) Sagebrush-Perennial Grass (II)	3,261,414	18	20-30	FRCC 1- 0 FRCC 2- 489,212 FRCC 3- 2,772,202
Grassland	Grassland (I) Alpine (V) Dry Meadow (I) Desert Grassland (I)	2,235,522	12	10-20	FRCC 1- 447 FRCC 2- 189,349 FRCC 3- 2,045,726
Blackbrush	Blackbrush (V)	1,045,622	6	5-10	FRCC 1- 0 FRCC 2- 1,045,622 FRCC 3- 0
Mountain Shrub	Mountain Shrub (II) Mountain Mahogany (IV) Oak (I) Maple (II)	370,680	2	1-5	FRCC 1- 0 FRCC 2- 311,371 FRCC 3- 59,309
Mixed Conifer	Spruce Fir (IV) Mountain Fir (IV) Spruce Fir-Mountain Shrub (III) Mountain Fir-Mountain Shrub (III) Aspen-Conifer (IV)	98,568	1	<1	FRCC 1- 23,656 FRCC 2- 74,912 FRCC 3- 0
Ponderosa Pine	Ponderosa Pine (I) Ponderosa Pine-Mountain Shrub (I)	81,402	<1	<1	FRCC 1- 0 FRCC 2- 0 FRCC 3- 81,402
Riparian and Wetland	Mountain Riparian (IV) Lowland Riparian (IV) Wet Meadow (I) Wetland (not assigned)	70,492	<1	<1	FRCC 1- 705 FRCC 2- 11,279 FRCC 3- 58,508
Creosote and Bursage	Creosote and Bursage (V)	58,078	<1	<1	FRCC 1- 0 FRCC 2- 58,078 FRCC 3- 0
Aspen	Aspen (IV)	22,802	<1	<1	FRCC 1- 0 FRCC 2- 22,802 FRCC 3- 0
* Estimated by local botanist, subject to review and revision.					

The widespread presence of invasive non-native species has greatly altered the resource character and values across the landscape and may pose an even greater threat in the future. Historic post-fire recovery processes may no longer dominate the

recovery and regeneration process due to introduced species. Cheatgrass and some of the knapweeds are known to alter (shorten) fire return intervals and may dramatically expand their range and coverage after fires. Degraded communities may facilitate expansion of invasive species (e.g., cheatgrass), have lower biological resource values and pose increased fire hazards.

3.4.3.1 Vegetation Types

Below are descriptions of vegetation types. See **Appendix D** for further Fire Regime and FRCC analysis. Included is a discussion of cheatgrass.

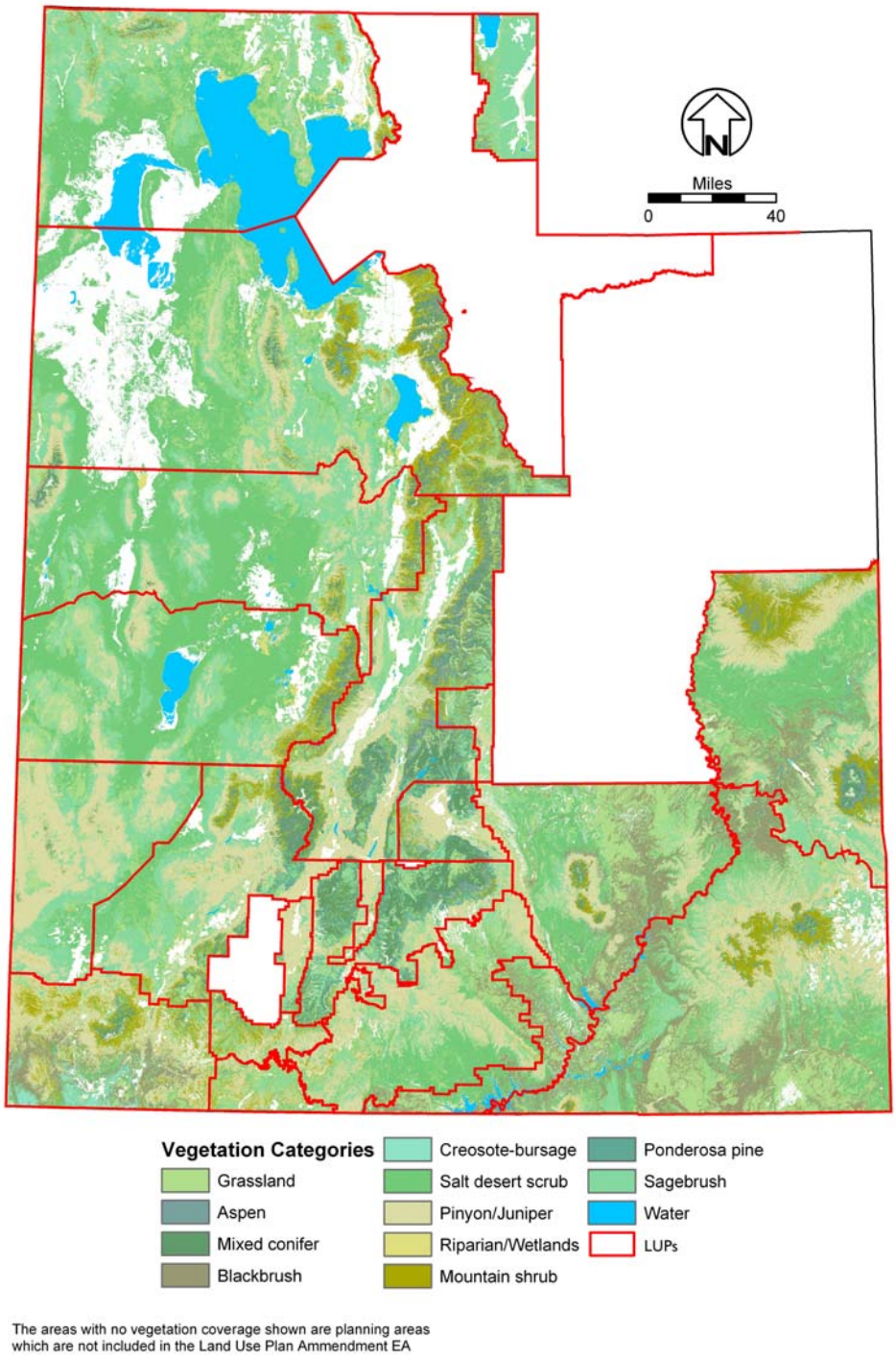
Salt Desert Scrub Salt desert scrub is perhaps the most arid vegetation type in the Intermountain West occurring at the low elevations valley bottoms (Knight 1994, Wood and Brotherson 1986). This cover type occurs in areas characterized by accumulations of salt in poorly developed soils and is the most abundant vegetation type covering about 29 percent of BLM land in the planning area. Historically, salt desert scrub likely covered more acres, but in the past 40 years, large expanses have been overtaken by invasive annual grasslands and annual forbs (cheatgrass and halogeton).

Salt desert scrub is characterized by salt tolerant succulent shrubs including greasewood, ephedra, shadscale, four-wing saltbush and threadleaf rubber rabbitbrush. Common grasses include inland saltgrass, alkali sacaton, bottlebrush, squirreltail and Indian ricegrass. Biological crusts are usually present and cover most of the interspaces between shrubs in intact, native species-dominated salt-desert scrub types. The invasive species cheatgrass, halogeton, tall peppergrass, Russian thistle and Russian knapweed can be found either scattered throughout or dominated within salt desert scrub, which generally has low productivity, naturally sparse understory vegetation and light fuels.

Fire Ecology Fire frequency has been estimated at 35 to more than 300 years for the salt desert scrub vegetation type (FEIS 2004) and is classified as Fire Regime V. Due to the risk of losing key ecosystem components and greatly increased fire regimes as invasive annual grasses dominate, salt desert scrub is typically classified as FRCC 3.

A lack of continuous cover (fuels) made fire rare to non-existent in salt desert scrub communities. Historically, these types did not burn often enough or in large enough patches to support dominance of fire-adapted plants. Most salt desert scrub species do not readily regenerate following fire. At present, cheatgrass has invaded large portions of Utah's salt desert scrub types and now provides sufficient fuel loading to support large, fast moving fires in this type. Where cheatgrass has invaded, native salt desert scrub communities have been permanently lost or are at high risk of loss. Further expansion of invasive species (cheatgrass, tall peppergrass and Russian knapweed) following fire is a major concern for salt desert scrub communities.

Figure 3.1 Statewide Vegetation Utah GAP Analysis



Pinyon and Juniper Woodland The relatively vast area (26 percent of total BLM-administered lands in the planning area) covered by this vegetation type is in part due historic land use practices including fire suppression and climatic change. It is estimated that pinyon and juniper woodland have increased ten-fold over the past 130 years throughout the Intermountain West (Miller and Tausch 2001). Many areas where juniper encroachment has occurred have also been invaded by cheatgrass in the understory, which raises concerns of further cheatgrass expansion following fire.

Old-growth pinyon and juniper woodland is estimated to be less than ten percent of the current area classified as pinyon and juniper woodland (Miller and Tausch 2001). These old-growth areas are often restricted to fire-safe habitats (e.g., steep, dissected and rocky terrain and in thin substrates along ridges). Old-growth pinyon and juniper can be characterized by rounded, spreading canopies; large basal branches; large, irregular trunks; and furrowed, fibrous bark (Miller and Rose 1999). Fire frequency has been estimated at 200 to more than 300 years for old-growth pinyon and juniper (Romme et al. 2002, Goodrich and Barber 1999) and would be classified as Fire Regime V.

Pinyon and juniper woodlands are characterized by trees that are less than 33 feet tall. They can comprise a closed or an open woodland. This is the most extensive forest type in Utah exceeding, in acreage, all other forests combined (Lanner 1984). On lower edges of the woodland zone, Utah juniper is frequently the only tree species. Colorado pinyon occurs in most of the state except in western Utah, where it is replaced with single-leafed pinyon (*Pinus monophylla*). Utah juniper is the more xeric of the two, often serving as nurse trees for pinyon in well-developed forests. The undergrowth is variable and dependent upon canopy closure, soil texture, elevation and aspect (Welsh et al. 1993).

Junipers are considered climax species for a number of pinyon and juniper, sagebrush steppe and shrub steppe habitats. Because it is resistant to wood-rotting fungi, Utah juniper has been and still is, used to make "cedar" posts. Pinyon and juniper may also be used as firewood and, to some extent, Christmas trees.

Fire Ecology Most of the area where pinyon and juniper woodland currently dominates was historically characterized by fires burning every 15 to 50 years (Kitchen 2004, Miller and Tausch 2001); this would characterize the Fire Regime as II. These areas in Utah are typically described by FRCC 2 (>7,000 feet) or 3 (<7,000 feet). Areas of FRCC 3 are characterized by dense stands of pinyon and juniper, scarce understory and high potential for cheatgrass invasion following fire. FRCC 2 has areas of encroached pinyon and juniper woodland, but less dense than FRCC 3 and are at less risk of cheatgrass invasion following fire.

Fire was the major historical cause of mortality for young juniper trees. However, adult juniper trees in mature stands are difficult to burn since the understory is usually sparse. Pure juniper stands need 35 mph winds or greater to carry wind through the canopy (Vegetation Types of the Wasatch-Cache National Forest 1991). It is generally agreed that fire was the most important natural disturbance that impacted the distribution of juniper and pinyon and juniper woodland before the introduction of livestock in the 19th century (Miller and Rose 1999). Burkhardt and Tisdale (1976; USDA 2002b)

concluded that fire frequencies of 30 to 40 years would help keep juniper from expanding into mountain big sagebrush communities.

Sagebrush Sagebrush cover types comprise 18 percent of vegetation BLM land in the planning area. During pre-settlement times, it is estimated that sagebrush steppe dominated as much as 25 percent of the land now administered by the Utah BLM. In the past one hundred years, the extent of sagebrush has been greatly reduced due to conversion to irrigated agriculture (private lands), livestock grazing, cheatgrass conversion, juniper encroachment and the deliberate eradication of sagebrush for range improvement. Recent drought conditions have also resulted in dramatic die offs of sagebrush. If these sites have a healthy understory of grasses and forbs, drought plays a similar role to wildfire by converting these stands to a perennial grass community. When cheatgrass is dominant in the understory, drought will convert these stands to an annual grassland type.

Since seral diversity applies to sagebrush, a considerable portion of the acreage listed under perennial grasslands (native) and areas with recent sagebrush seedings may be considered as representing the early seral component of sagebrush communities. In addition, at the scale of mapping for this EA, many areas identified as annual and perennial grasslands may contain inclusions of sagebrush steppe communities.

Healthy sagebrush is a patchwork mosaic of seral communities that range from recovering perennial grass-shrublands following natural fire, to old growth, decadent sagebrush steppe with high canopy cover and reduced herbaceous understory (Wyoming Interagency Vegetation Committee 2002). The three main subspecies of big sagebrush (*Artemisia tridentata*) are as follows:

Low to mid elevations (generally found at <6,500 feet elevation; approximately 85 percent of Utah sagebrush cover is found at low to mid elevations):

- Wyoming big sagebrush (*Artemisia tridentata wyomingensis*). This subspecies grows in pinyon and juniper and below on plains and foothills at elevations of 5,000 to 7,000 feet. Wyoming big sagebrush often grows on drier sites adjacent to valley bottoms that support basin big sagebrush. Because it is such an extensive, variable ecosystem in western United States, Wyoming big sagebrush is considered a keystone species with a diverse number of species that either directly or indirectly depends on it. This includes: fungi, lichens, insects, reptiles, birds, mammals and saprophytic vascular plants.
- Basin big sagebrush (*Artemisia tridentata tridentata*). This subspecies grows with Wyoming big sagebrush in valley bottoms, dry plains and hills at elevations of 4,000 to 7,300 feet in elevation. Basin big sagebrush grows taller (up to six feet) and blooms later than Wyoming big sagebrush. Basin big sagebrush constitutes most of Utah's sagebrush and grows in deep, well-drained sandy to loamy soils. With the advent of irrigation much of its habitat has been lost to agriculture or is located on private lands. In areas that receive no supplemental irrigation (e.g., rangelands), much of the sagebrush habitat type has been converted to a seeded graminoid type. Many of these grass species are non-native, such as crested wheatgrass (*Agropyron cristatum*) which out-compete native bunchgrasses such as blue-bunch (*Agropyron spicatum*). Other non-native graminoid species such as smooth brome (*Bromus inerme*) exhibit alleopathic

properties (Sindelar 2004). On the upper end of the 10 to 16 inches of precipitation belt with cooler temperatures, sagebrush have more intact native communities (characterized by bunchgrasses {*Agropyron spp*} and diverse perennial forbs) and appear to be more resilient to annual grasses. On the lower end of the 10 to 16 inches of precipitation belt, characterized by warmer soils, much of the sagebrush communities have degraded with extensive conversion to cheatgrass (*Bromus tectorum*) dominated understories.

Mid to high elevation (generally found at >6,500 feet elevation; approximately 15 percent of Utah sagebrush cover is found at mid to high elevations):

- Mountain sagebrush (*Artemisia tridentata vaseyana*). This subspecies grows in pinyon and juniper woodland and above, on foothills and mountain sides at elevations of 5,100 to 10,200 feet in the 14- to 20-inch precipitation zones, with cooler soils and more resilient, intact native communities than low elevation sagebrush. They are more susceptible to juniper encroachment mainly as a result of fire suppression. Depending on the soil type and depth, a variety of perennial grasses and forbs may dominate the understory.

Moisture and temperature keep all three subspecies from moving within their range. Studies show that the maximum canopy cover for sagebrush is 30 percent (Winward 1997). In the absence of fire, sage canopy cover increases. Besides canopy cover, age class is important for wildlife. Studies show a mosaic of sagebrush age classes is preferable over a stand of sagebrush with the same age-class for wildlife. Because sagebrush is a relatively short-lived species, in the absence of fire there is no recruitment of younger individuals, consequently the stand has the tendency to become old and decadent.

Fire Ecology Fire frequency varies for the different sagebrush species and subspecies, but is considered to be between 10 and 110 years depending on precipitation, elevation, sagebrush species and associated vegetation. Although sagebrush does not re-sprout with fire, it is a prolific seeder and studies show that sagebrush seed have higher germination rates in burned soil (FEIS 2004).

Pre-settlement, stand-replacing fire frequencies for low-elevation sagebrush are estimated to vary from 60 to 110 years (Whisenant 1990; Peters and Bunting 1994; Miller et al. 2001). For mountain big sagebrush, pre-settlement stand replacing fire frequencies have been estimated to vary between 10 and 25 years (Houston 1973; Harniss and Murray 1973). Sagebrush is characterized by Fire Regime II; it is considered to be generally in a FRCC 2 if it is above 6,500 feet and FRCC 3 below 6,500 feet because of high risk of losing key ecosystem components following fire due to cheatgrass invasion.

The cold-desert climate, with cold, wet-to-dry winters and springs and dry, hot summers predispose sagebrush communities to an evolutionary history with recurring fire. The interval between fires must have been sufficiently long for big sagebrush, which does not re-sprout and re-colonizes from seeds, to regain dominance; otherwise, the extensive areas characterized as sagebrush steppe would have become dominated by root-sprouters such as the rabbitbrushes or horsebrush (Wright et al. 1979).

Most sagebrush species do not sprout after fire and most plants are killed by low- to high-severity fires. This is true of all three subspecies of big sagebrush common throughout Utah. Generally, the herbaceous understory composition does not

determine the intensity and severity of wildland fires—sagebrush itself is the primary fire carrier. The high canopy cover associated with late, mature sagebrush stands likely facilitated historic stand-replacing fires. However, the pre-fire understory is an important determinant of post-fire response. A sagebrush stand with a robust understory of native grasses and forbs would generally be replaced after fire with native perennial grassland. Degraded sagebrush stands with poorly evolved native understories are most vulnerable to colonization by invasive species after fire (USDA 2002a, USDA 2002b, USDA 2002e). As sagebrush seeds generally are not transported far from the parent (e.g., <30 meters), unburned areas within large burn areas are often the most important source of seed material for natural recruitment and re-establishment of sagebrush (USDA 2002e). Also, studies show that burned soil and sagebrush seed have higher germination rates. Although sagebrush does not re-sprout with fire, it is a prolific seeder and if a seed source is present, re-establishment is quite rapid and dominance will occur within 20 years (Winward 1997).

Grasslands According to GAP analysis, grasslands cover 12 percent of BLM land in the planning area. Grasslands types include: native perennial grasslands, seedings of native species and exotic perennial grasses (primarily crested wheatgrass) and some cheatgrass. Because it plays a major role in Utah's grassland ecology, cheatgrass is discussed in this section.

Crested wheatgrass dominated grasslands are the deliberate result of historic range improvement projects and post-fire seedings. Other perennial grasslands have expanded due to the eradication of shrubs, especially sagebrush species or due to wildland fires burning on rangelands where cheatgrass did not invade or does not dominate. Native perennial grasslands are an intermediate successional stage that would eventually return to a diverse sagebrush steppe habitat if allowed to recover for extended periods (20 to 70 years) without impacts from wildland fires. Native perennial grass species include: blue-bunch wheatgrass, Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, Nevada bluegrass, thickspike wheatgrass, western wheatgrass, galleta grass, blue grama, needle-and-thread grass, basin wildrye, sheep fescue and others.

Due to increased fire intervals and subsequent loss of topsoil, perennial grasslands dominated by crested wheatgrass and/or other non-native species are stable communities that do not trend toward recovery to sagebrush steppe habitat as quickly as native perennial grasslands. Historically, native perennial grasslands would have formed part of the seral mosaic of the sagebrush steppe habitat, although it is unclear how widespread they once may have been represented across the landscape. Perennial grasslands dominated by cheatgrass do not typically revert to the native community with passive restoration.

Fire Ecology Since native grasslands are often seral to sagebrush, fire regimes are similar—Fire Regime II. Perennial grasses respond vigorously to fires of various severities by re-sprouting from basal growing points following fire. The primary determinant of fire response in native perennial grasslands is fire residence time. Fast, high-intensity fires have a short residence time and seldom cause substantial mortality to native perennial bunchgrasses. Slow backing fires have a longer residence time and greater severity; mortality to native perennial bunchgrasses may be high under these conditions. With most natural ignitions, the predominant fire spread would be as a fast moving head fire.

Cheatgrass Introduced from Eurasia in the late 1800s (FEIS 2004), cheatgrass is an opportunistic winter annual that germinates between autumn and spring when temperatures and soil moisture are suitable. Warm season grasses such as galleta grass, blue gamma grass and sand dropseed become dormant through winter and are slower to develop in the spring. Native grasses are not dormant in the winter; most of them will become green again in the fall and retain greenness throughout the winter. Growth of native grasses, however, is suppressed until temperatures are warm enough in the spring for the plants to grow. Cheatgrass may be present in relatively undisturbed plant communities, but usually becomes dominant on disturbed sites (Fielding and Brusven 2000). Although it does occur, cheatgrass has been less successful in dominating sites that are above 7,000 feet. This process of shrub loss and conversion to annual grasslands is a key management problem that affects nearly every use of public rangelands. The lack of shrub cover makes for poor-quality wildlife habitat, so annual grasslands have diminished plant and animal diversity. Cheatgrass is also inferior livestock forage.

Using the most current provisional data (REGAP 2004), invasive annual grasses including cheatgrass are the predominant cover type on 362,764 acres of BLM-administered land. Invasive annual grasses occur primarily in the northwestern and central portions of Utah. They have replaced primarily sagebrush communities and grasslands.

Efforts have been made to re-convert some cheatgrass cover to perennial grasses. A primary strategy during the last 40 years has been to plant crested wheatgrass because it is relatively easy to establish and seems to be able to compete with cheatgrass (Fielding and Brusven 2000). Historically post-fire seedings were established as monocultures of crested wheatgrass. In the more recent past (10-20 years) seeding mixes have included a mix of non-native seed and current trends favor the use of native seed mixes that include grasses, forbs and shrubs.

The criteria for determining when cheatgrass becomes an invasive concern or a fire concern are not readily assigned. Limbach (2004) has offered unofficial guidance of five percent cover as an invasive concern and 15 to 20 percent cover as a fire and fuels concern (both percentages relative to associated understory species). Degraded sites are most susceptible to annual grass invasion after fire. An abundance of cheatgrass in the understory enhances the likelihood of fire spread and conversion of sagebrush steppe or salt desert scrub to annual grassland (USDA 2002a).

Fire Ecology Wherever cheatgrass dominates, the prevailing FRCC is 3 due to the loss of key ecosystem components such as native species. The fire regime of cheatgrass dominated sites is the historical fire regime of that site before it was invaded by cheatgrass. For example, where cheatgrass has invaded a salt desert scrub community, the fire regime would be Fire Regime V.

The establishment of cheatgrass in a wildland community fosters much more frequent fire return intervals by extending the time during which the community is susceptible to wildland fire ignitions. In the summer, cheatgrass dries out four to six weeks earlier than perennial grasses and forms a fine-textured, highly flammable fuel.

The increased frequency of fire on annual grasslands increases the costs of fire suppression (Fielding and Brusven 2000). Once cheatgrass dominates a site, the fire regime is altered to more frequent stand-replacing fires; e.g., the cheatgrass fire

regime. Shortened natural and historical fire rotations impact perennial vegetation by killing the tops of the plants and allowing less time and fewer growing seasons between recurrent fires. Cheatgrass seed production can be impacted by prescribed fire when it is applied during the brief period between the purple stage and when the seeds are dropped.

Blackbrush Blackbrush communities are restricted to portions of the Colorado Plateau and occupy approximately six percent of Utah BLM lands in the planning area. These types are characterized by widely spaced blackbrush shrubs, with sparse vegetation in the interspace in intact native communities. These communities are often associated with shallow soils or those with hardpans near the surface. Cheatgrass expansion into this vegetation type poses a serious threat by providing a continuous understory of fine fuels and reducing fire return intervals in an otherwise non-fire-adapted community. Wildlife such as deer, elk, desert bighorn sheep, pronghorn, squirrels, rabbits, game and migratory birds, use blackbrush for cover, browse and seeds. Livestock use is more limited due to its low nutritional value and palatability (Paysen et al. 2000).

Fire Ecology Fires in blackbrush were historically infrequent. This ecosystem is at moderate risk of losing key ecosystem components due to fire. It is characterized by Fire Regime V and FRCC 2. Once cheatgrass dominates a blackbrush site, the site would then be FRCC 3. Recent experience on Utah BLM land has shown that blackbrush does not respond favorably to fire (Callison et al. 1985). In addition, much of the blackbrush in Utah has suffered substantial dieback due to on-going drought conditions. Burning has promoted succession to grassland by destroying the biological crust that stabilizes the soil. The biological crust provides important soil microflora apparently required for blackbrush survival or re-establishment (Paysen et al. 2000). Frequent large fires can be problematic from a management standpoint because recovery can take more than four decades or, in some cases, there is no recovery (Wright and Bailey 1982, Paysen et al. 2000). Blackbrush is often found in monocultures with few other plants present. Therefore, seedbanks are often deprived of other plant species.

Mountain Shrub Mountain shrub occupies about two percent of Utah BLM lands and occurs as a transition vegetation type between sagebrush and conifer types. It is found at moderately high elevations (7,000 to 8,500 feet). Mountain shrub is usually found on north and east slopes that tend to be cooler and moister than south and west aspects. Mountain shrub is a highly diverse community made up in part of Gambel's oak, chokecherry, serviceberry, currant, mountain snowberry, elderberry, bitterbrush and mountain sagebrush. The mountain shrub community, with its high productivity and diverse herbaceous understory, provides important biodiversity, wildlife habitat and protective ground cover. Mountain shrub communities rapidly recycle nutrients into fruits, seeds and juicy leaves providing animals with an abundance of food. With its characteristically high productivity and diverse herbaceous understory, it provides important biodiversity, wildlife habitat and protective ground cover to the ecosystem.

Fire Ecology Stand-replacing fire frequency ranges from 25 to 100 years in mountain shrub (Gruell and Loope 1973), though return intervals may vary widely with changes in elevation, aspect, site moisture and the associated forest or woodland type. Mountain shrubs are classified as Fire Regimes I, II and IV depending on the dominant species. FRCCs also vary depending on the dominant species, although most mountain shrub communities are in FRCC 2 due to some missed fire return intervals, moderate risk of

losing key ecosystem components and moderately altered vegetation attributes. However, some mountain shrub communities at lower elevations (<6,500 feet) are classified as FRCC 3 due to the high risk of cheatgrass invasion following fire.

Most species of mountain shrubs re-sprout following low- to moderate-severity fire. Sprouting mountain shrub communities generally recover following wildland fire and are considered to be fire-tolerant. Mountain sagebrush and bitterbrush do not re-sprout and, depending on the severity of the fire, may be completely removed from a site. Evidence shows that bitterbrush may benefit from low-severity fire (Vegetation Types of the Wasatch/Cache NF 1991).

Mixed Conifer Major forest community types of mixed conifer include Douglas-fir, lodgepole pine, Englemann spruce and sub-alpine fir. These communities occupy less than one percent of the BLM-managed lands in Utah and generally occur at elevations above 7,000 feet. These forest types do, however, have a high value for recreation, aesthetics, special status species habitat and wood product production.

Fire Ecology Fire frequencies in mixed conifer range from 100 to 300 years. These forests are characterized by a combination of understory and complete stand-replacement fire regimes (Arno 2000). Mixed conifer is classified as Fire Regime III or IV depending on the elevation and related dominant species. For example, conifer-shrub communities, occurring at lower elevations that have pure conifer stands, would be characterized by Fire Regime III. Due to the longer historic fire return intervals and well-functioning vegetation attributes, mixed conifer is classified as FRCC 1 when associated with Fire Regime IV and FRCC 2 when associated with Fire Regime III.

This mixed severity fire regime often results in a mosaic pattern of stand structure and fuels. Past stand burn mosaics tend to increase the probability that subsequent fires will also burn in a mixed pattern (Arno 2000). Dead woody fuels often accumulate on the ground in a haphazard manner; the greatest fuel loadings tend to occur on the most productive sites, which are predominantly stand-replacement fire regimes.

Ponderosa Pine Ponderosa pine occupies less than one percent of the Utah BLM lands; these lands are mostly located in the southeast quadrant of Utah. Ponderosa pine types are characterized by an open, savannah-like appearance where widely spaced large trees are present with open understories that are periodically cleared by low-severity groundfires. This type has no particular community type, but rather the understory constitutes whatever community is growing nearby.

Fire Ecology Fire frequency for ponderosa pine communities ranges from 10 to 40 years with low- to mixed-severity (FEIS 2004) fires. Ponderosa pine forests in Utah are classified as Fire Regime I and FRCC 3. These forests have typically missed between five and ten fire cycles in the years of fire suppression and could be at risk for cheatgrass invasion or crown fire if not properly managed. Otherwise, the associated understory species exclude cheatgrass. Ponderosa pines have thick bark, which protects them from serious damage from surface fires; it is considered the most fire-adapted conifer in the West (Bradley et al. 1992).

Riparian and Wetland While riparian areas occupy only a small portion of the overall landscape (<1 percent of the planning area), they provide important fish and wildlife resource values, especially in the arid landscapes that characterize the bulk of BLM-

administered land in Utah. Riparian vegetation is typically composed of water dependent communities along both sides of rivers and streams and adjacent to wetlands. Native tree communities may be dominated by Fremont or narrowleaf cottonwoods with understories of shrubs (such as sandbar, whiplash and Booth's willows) and herbaceous species.

Invasive species such as tamarisk, tall whitetop and Russian olive have become well established in the riparian communities and are slowly replacing the native vegetation across much of Utah. Tamarisk is especially problematic as it is much more flammable than the native vegetation that it replaces.

Fire Ecology Historically, fire in these riparian communities would have been infrequent and varied from small size, with highly mosaic burn patterns as a result of the higher moisture content generally present in riparian areas and species, to stand-replacing burns likely to have occurred only in extreme drought periods. These riparian communities are in a Fire Regime IV with most areas presently in FRCCs 2 and 3. Lower elevation riparian areas would be in FRCC 3 due to higher incidence and potential of invasive species.

Fremont cottonwood communities are characterized by a late seral stage (e.g., all mature to late-mature trees) with little representation of younger age-classes and are not typically fire-adapted. Narrowleaf cottonwood is a somewhat fire-adapted species that may re-sprout from roots, provided the stands are not decadent and occur in areas where the water table remains reasonably high throughout the growing season. The life history and ecology of cottonwoods are intimately tied with flooding, erosion and deposition on the flood plains because the seeds only germinate and establish on bare, moist alluvium. Willow species typically sprout vigorously following a fast-moving fire. Slow moving fires are generally more damaging, presumably due to greater heat transfer to root crowns.

Creosote and Bursage Creosote and white bursage comprise less than one percent of the vegetation acreage in Utah and are restricted to the southwest corner of Utah. Historically, creosote was restricted to well-drained knolls and foothills (Paysen et al. 2000). However, between the mid-1800s and early 1900s, creosote bush had encroached into areas dominated by grasslands (Valentine and Gerard 1968). While historic overgrazing and recent drought have contributed to the expansion of creosote (Buffington and Herbel 1965), fire suppression may also have contributed to the expansion.

Creosote is unpalatable for livestock and wildlife (Paysen et al. 2000); however, bursage is palatable to herbivores, especially in the spring when new leaders produce tender green growth. Collectively, these species can provide some wildlife cover and forage.

Fire Ecology Creosote and bursage is classified as Fire Regime V and FRCC 2. Fires were typically infrequent due to the lack of understory vegetation necessary to carry a fire. These stands are at moderate risk of losing key ecosystem components following fire due to the long re-establishment timeframes and the potential for annual grass invasion.

Aspen Aspen-dominated types occupy less than one percent of the Utah BLM lands. They can be climax or seral to conifer communities (e.g., Douglas-fir) and are found

between 6,500 to 10,500 feet. Aspen occurs as pure stands or in association with various conifers such as Engelmann spruce, ponderosa pine, white fir, sub-alpine fir and Douglas-fir. Although conifer invasion is a natural pattern in many aspen stands due to long-term fire suppression throughout Utah, it has resulted in an increased representation and dominance by conifer in aspen stands, thus reducing the extent of aspen-dominated stands (Mueggler 1989). Overall wildlife habitat quality has declined, while acreage of decadent stands and the attendant fuel loadings have increased.

Fire Ecology Fire frequencies range between 25 to 100 years with mixed severity (Gruell and Loope 1974). Aspen is characterized by Fire Regime IV and FRCC 2. Fire regimes and vegetation structure have been moderately altered from the historical conditions. Pure stands of aspen are particularly susceptible to mortality of above-ground stems from fire of low severity, even though aspen is well adapted to regeneration by sprouting after fire (Jones and DeByle 1985, Mutch 1970). Aspen stands do not easily burn and often act as natural fuelbreaks during wildland fires. Fires in young aspen stands tend to be low-intensity surface fires unless there is a great deal of understory fuel. In older stands, during the warmest and/or driest months of the year, abundant fuels can lead to higher-intensity fires. Decadent aspen stands and other areas with thin, acidic soils may be less vigorous at regenerating via suckering and may tend to support conifers even after fire (USDA 2002i).

3.4.3.2 Noxious Weeds

Invasive and noxious weeds are an increasing problem on BLM lands. Invasive and noxious weeds rapidly displace desirable plants that provide habitat for wildlife and food for people and livestock. Some weeds are poisonous to wildlife, livestock and people. Many noxious weeds and invasive species were originally brought inadvertently by European settlers to the United States in grain seed, livestock feed and ship ballasts (Harvey and Ruyle 2002). Weeds slowly spread across the country as different parts were settled. Further accidental introductions have occurred, for example, through contaminated crop seed or livestock forage. They include species such as cheatgrass and halogeton (see "Cheatgrass" above). Some invasive weeds were introduced for specific purposes such as livestock forage, horticultural reasons or soil stabilization and they escaped into natural vegetation communities. Examples include buffelgrass and salt cedar. These invasive and noxious weeds are likely to have spread mainly through cross-country travel (e.g., using off-highway vehicles), hiking and camping activities and through the movement of wildlife and/or livestock. Invasive and noxious weeds may readily establish in highly disturbed areas (e.g., where the cumulative impacts of fire, grazing and recreation activities are compounded). The spread of invasive weeds poses a hazard to vegetation communities on BLM rangelands because weeds are aggressive, broadly adaptive and lack natural predators; they can displace native plants as they compete for space, sunlight, water and nutrients. As such, weeds can cause drastic changes in the composition, structure and productivity of vegetation communities. Also, weeds can alter the mix of native vegetation and reduce ungulate forage quality or be poisonous to livestock.

Noxious weeds are listed by state and federal law and are generally considered as negatively impacting agriculture, navigation, fish, wildlife or public health (Howery and Ruyle 2002). **Table 3.3** lists weed species that have been officially designated as noxious weeds and published as such for Utah, as per the authority vested in the Commissioner

of Agriculture under Section 4-17-3 of the Utah Noxious Weed Act. There are other invasive weeds such as cheatgrass, buffelgrass, red brome and salt cedar that are not listed as noxious, but still can be problematic on Utah rangelands. These plants are considered invasive weeds because they displace and reduce the normal composition and productivity of native rangeland vegetation. In addition, they may raise the risk of wildland fire because of increased flammability and biomass accumulation in rangeland vegetation communities.

Table 3.3 Utah Regulated and Restricted Noxious Weeds

Species	Common Name
Agropyron repens	Quackgrass
Cardaria draba	Globed-podded hoary cress (= whitetop)
Carduus mutans	Musk thistle
Centaurea diffusa	Diffuse knapweed
Centaurea maculosa	Spotted knapweed
Centaurea repens	Russian knapweed
Centaurea solstitialis	Yellow starthistle
Centaurea squarrosa	Squarrose knapweed
Convolvulus arvensis	Field bindweed
Cynodon dactylon	Bermudagrass
Cirsium arvense	Canada thistle
Euphorbia esula	Leafy spurge
Isatis tinctoria L	Dyers woad
Lepidium latifolium	Perennial pepperweed
Lythrum salicaria L	Purple loosestrife
Onopordum acanthium	Scotch thistle
Sorghum halepense	Johnsongrass
Sorghum halepense L (=Sorghum almum)	Perennial sorghum
Taeniatherum caput-medusae	Medusahead

Fire Ecology The high growth rate and flammability of weeds tend to increase the risk of wildfire to the vegetation community and structures in the WUI (Arno and Wakimoto 1987). Invasive weeds such as cheatgrass, red brome and buffelgrass can alter fire regimes and cause fire re-occurrence to increase when they outcompete more fire-resistant native vegetation. They also provide flammable fuels between the interspaces among shrubs that allow the fire to carry in an unnatural manner (McAuliffe 1995, Brown 2000).

3.4.4 Special Status Species

3.4.4.1 Species Composition

This section addresses special status plant and animal species, which can be broken out into two parts:

- ESA-related species—including those listed as endangered, threatened and proposed under the Endangered Species Act of 1973, as amended (ESA), some

of which have designated or proposed critical habitat, as well as candidate and petitioned species (**Appendix F: ESA-Related Species Found Within the Planning Area**). Threatened, endangered and proposed species are under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). Candidate and petitioned species do not receive protection under the ESA; however, because they are given recognition in this document and the associated BA as candidates for federal listing under the ESA and species petitioned for federal listing under the ESA, respectively, they are discussed under the heading related to the ESA.

- BLM-sensitive species—including BLM and UDWR Wildlife Species of Concern, BLM Sensitive Plant Species and species managed through Conservation Agreements in which BLM participates (**Appendix G: BLM Sensitive Species Found within the Planning Area**). It should be noted that non-plant species on the Utah Sensitive Species List have been adopted as BLM-sensitive species.

Several special status species found within the Utah planning area are discussed in the LUPs listed in Chapter 1 and are incorporated here by reference. However, additional species may have been listed or species' status has changed, since the time the LUPs were written. The most recent and complete list of special status species is considered in this section. Each of these species is listed by common name in **Appendix F**, followed by scientific name, federal status, associated vegetation community and Field Office(s) with management authority.

ESA-Related Species Eighteen endangered, thirteen threatened, five candidate (two of which have been petitioned for listing) and six petitioned species are known to occur on or adjacent to the planning area. These 42 federally listed species can be grouped as follows: seventeen flowering plants, seven birds, six mammals, eight fish, three invertebrates and one reptile.

Ten of the 42 federally protected species (one flowering plant, one bird, seven fish and one reptile) have designated critical habitat on BLM-administered lands in Utah. One invertebrate and one bird species have areas proposed for critical habitat designation. These designations and proposals are presented in **Table 3.4** below.

Of the 42 federally listed species with potentially suitable habitat within the planning area, two were previously considered to have been extirpated from the state: the black-footed ferret (endangered) and California condor (endangered). An experimental, non-essential population [ESA, Section 10(j)] of black-footed ferrets has been established outside of the planning area for this EA, and an experimental, non-essential population of California condors has been re-established in a designated use area covering eight counties in Utah. "Experimental, non-essential populations" of federally listed species are considered by BLM management authorities to be equivalent to a federal listing status of "proposed." Within the planning area, no wild populations of the black-footed ferret exist, and it is thought to be extirpated.

Table 3.4 Federally Listed Species and their Proposed or Designated Critical Habitat

Species	Critical Habitat	General Location
Welsh's milkweed	Designated	Southwestern Kane County
Southwestern willow flycatcher	Proposed	Southern Washington County
Mexican spotted owl	Designated	Southern and eastern Utah in nine counties
June sucker	Designated	Central Utah County
Humpback chub	Designated	Eastern Utah in seven counties
Bonytail	Designated	Eastern Utah
Virgin River chub	Designated	Southern Washington County
Woundfin	Designated	Southern Washington County
Colorado pikeminnow	Designated	Eastern Utah in seven counties
Razorback sucker	Designated	Eastern Utah
Kanab ambersnail	Proposed	Southwestern Kane County
Desert tortoise	Designated	Southern Washington County

BLM-Sensitive Species Fifty-six Wildlife Species of Concern, 83 Sensitive Plant Species and 8 Conservation Agreement species are known to occur on or adjacent to the planning area. These 147 BLM-sensitive species can be grouped as follows: 83 flowering plants, 13 birds, 11 mammals, 10 fish, 16 invertebrates, 3 amphibians and 12 reptiles. Most of the BLM-sensitive species are listed in **Appendix G**; two of the Sensitive Plant Species and flowering plants (Goose Creek milk-vetch and Mussentuchit gilia) that are also federally listed, are listed only in **Appendix F**.

3.4.4.2 Species Habitat

Habitats associated with each special status species, and their distribution, are widely variable. Some species are found throughout the planning area while others are endemic to a single location. As noted above, Utah GAP Analysis was used to identify cover types pertaining to this project. Utah GAP Analysis provides an indicator of vegetation coverage and habitat types at the large scale, but is not particularly accurate on the ground for site-specific projects. Consequently, it is possible that the expanse (acreage or boundary) of a cover type could be inaccurate, and that cover types, and species associated with these cover types, may not actually be present at the project-specific level.

Cover types identified include salt desert scrub, pinyon and juniper woodland, sagebrush, grassland, blackbrush, mountain shrub, mixed conifer, ponderosa pine, riparian and wetland, aspen and creosote and bursage. The blackbrush and creosote and bursage cover types have similar dominant species and, therefore, provide similar habitat for the species discussed in this section. Consequently, for the purposes of this and the Fish and Wildlife section, below, the blackbrush and creosote and bursage cover types have been condensed into one general wildlife habitat type hereafter referred to as blackbrush.

Vegetation cover types and their prevalence on BLM-administered lands throughout the planning area are identified in **Table 3.2** of the Vegetation section, above. Though

not described as a vegetation cover, water is valuable wildlife habitat and has the potential to be impacted by the proposed project.

The following is a list of special status species (split into federally listed species and BLM-sensitive species, respectively) generally associated with each vegetation community. It should be noted that special status plant species are not necessarily associated with vegetation community types, but are more closely associated with substrate type. Therefore, plant species listed in the vegetation community associations below do not infer an actual association, but rather indicate the vegetation community surrounding each plant species. **Appendix G** also presents associated substrates for each plant species.

SALT DESERT SCRUB

ESA-Related Barneby reed-mustard, shrubby reed-mustard, Wright fishhook cactus, Jones cycladenia, Siler pincushion cactus, Winkler cactus, clay reed-mustard, Uinta Basin hookless cactus, last chance townsendia, horseshoe milk-vetch, Graham's beardtongue, White River beardtongue, Goose Creek milk-vetch, Mussentuchit gilia, California condor.

BLM-Sensitive Chatterley's onion, gumbo milk-vetch, Cronquist milk-vetch, Pohl's milk-vetch, pink egg milk-vetch, Peabody's milk-vetch, Cisco milk-vetch, escarpment milk-vetch, current milk-vetch, dunes four-wing saltbush, mound cryptanth, Creutzfeldt-flower, Pipe Springs cryptanth, small spring parsley, Cronquist buckwheat, Big Flattop buckwheat, Ibex buckwheat, bluff buckwheat, Utah spurge, Cataract gilia, Canyonlands lomatium, entrada rushpink, Shultz blazing star, Trotter oreoxis, Tuhy's breadroot, Neese narrowleaf penstemon, Franklin's penstemon, pinyon penstemon, alcove rock daisy, Parry's petalonyx, bluff phacelia, Utah phacelia, Jones indigo-bush, Jones' globemallow, Smoky Mountain globemallow, Jane's globemallow, psoralea globemallow, White River swertia, Kanab thelypody, Sevier townsendia, tropic goldeneye, spotted bat, fringed myotis, kit fox, zebra-tailed lizard, western banded gecko, common chuckwalla, sidewinder, speckled rattlesnake, Mojave rattlesnake, western threadsnake.

PINYON AND JUNIPER WOODLAND

ESA-Related Shivwitz milk-vetch, Barneby ridge-cress, Kodachrome bladderpod, San Raphael cactus, shrubby reed-mustard, Wright fishhook cactus, Welsh's milkweed, Jones cycladenia, Maguire daisy, Winkler cactus, Uinta Basin hookless cactus, last chance townsendia, Rabbit Valley gilia, Graham's beardtongue, White River beardtongue, Goose Creek milk-vetch, Mussentuchit gilia, California condor, Mexican spotted owl, Coral Pink Sand Dunes tiger beetle.

BLM-Sensitive Pink egg milk-vetch, Peabody's milk-vetch, escarpment milk-vetch, basalt milk-vetch, dunes four-wing saltbush, Baird's camissonia, slender camissonia, Gould's camissonia, Ownbey thistle, Pipe Springs cryptanth, small spring parsley, pinnate spring parsley, Kass rockcress, Nevada willowherb, Cronquist buckwheat, Ibex buckwheat, scarlet buckwheat, Frisco buckwheat, Ostler's Ivesia, cliff jamesia, Claron pepperplant, Ostler pepperplant, Canyonlands lomatium, Cutler's lupine, Dolores rushpink, entrada rushpink, Murdock's evening primrose, Trotter oreoxis, Barneby's breadroot, Tuhy's breadroot, Kane breadroot, Neese narrowleaf penstemon, Idaho penstemon, pinyon

penstemon, Cronquist's phacelia, Atwood's pretty, Chinle chia, Smoky Mountain globemallow, psoralea globemallow, Bicknell thelesperma, Kanab thelypody, Sevier townsendia, Frisco clover, Lewis's woodpecker, fringed myotis, Eureka mountainsnail, western banded gecko.

SAGEBRUSH

ESA-Related Wright fishhook cactus, Welsh's milk-vetch, Uinta Basin hookless cactus, horseshoe milk-vetch, White River beardtongue, Goose Creek milk-vetch, California condor, bald eagle, Mexican spotted owl, Gunnison sage grouse, greater sage grouse, black-footed ferret, Utah prairie dog, white-tailed prairie dog, Gunnison prairie dog, pygmy rabbit, Coral Pink Sand Dunes tiger beetle.

BLM-Sensitive Pohl's milk-vetch, pink egg milk-vetch, slender camissonia, Gould's camissonia, Ownbey thistle, Pipe Springs cryptanth, small spring parsley, Frisco buckwheat, four-petal jamesia, Claron pepperplant, Dolores rushpink, Neese narrowleaf penstemon, Franklin's penstemon, Idaho penstemon, pinyon penstemon, Cronquist's phacelia, Atwood's pretty, Sevier townsendia, ferruginous hawk, dark kangaroo mouse, Eureka mountainsnail, Lyrate mountainsnail, smooth greensnake.

GRASSLAND

ESA-Related Kodachrome bladderpod, Wright fishhook cactus, clay reed-mustard, Graham's beardtongue, White River beardtongue, Mussentuchit gilia, black-footed ferret, Utah prairie dog, white-tailed prairie dog, Gunnison prairie dog.

BLM-Sensitive Grouse Creek arabis, slender camissonia, Big Flattop buckwheat, Paria iris, Franklin's penstemon, Jones indigo-bush, Jones' globemallow, Smoky Mountain globemallow, grasshopper sparrow, short-eared owl, burrowing owl, ferruginous hawk, long-billed curlew, sharp-tailed grouse, silky pocket mouse, Mexican vole, Eureka mountainsnail.

BLACKBRUSH

ESA-Related Dwarf bear-poppy, Shivwitz milk-vetch, Holmgren milk-vetch, Siler pincushion cactus, Mojave desert tortoise.

BLM-Sensitive Gumbo milk-vetch, Cronquist milk-vetch, dunes four-wing saltbush, Baird's camissonia, hole-in-the-rock prairieclover, Utah spurge, Dolores rushpink, Parry's petalonyx, Chinle chia, Smoky Mountain globemallow, desert iguana, gila monster, desert night lizard.

MOUNTAIN SHRUB

ESA-Related Shrubby reed-mustard, Maguire daisy, Rabbit Valley gilia, Mussentuchit gilia.

BLM-Sensitive Chatterley's onion, pinnate spring parsley, Kass rockcress, Nevada willowherb, scarlet buckwheat, Deep Creek stickseed, Pine Valley goldenbush, cliff jamesia, four-petal jamesia, Clark's lomatium, sandloving penstemon, pinyon penstemon, Atwood's pretty, House Range primrose, Bicknell thelesperma, black swift, Lewis's woodpecker, Townsend's big-eared bat, spotted bat, Allen's big-eared bat, big free-tailed bat, Eureka mountainsnail, Lyrate mountainsnail, Yavapai mountainsnail, western banded gecko.

MIXED CONIFER

ESA-Related Bald eagle, Canada lynx.

BLM-Sensitive Kass rockcress, Deep Creek stickseed, Pine Valley goldenbush, Cedar Breaks goldenbush, Cottam cinquefoil, Bicknell thelesperma, rock violet, northern goshawk, black swift, Lewis's woodpecker, three-toed woodpecker, Townsend's big-eared bat, spotted bat, Allen's big-eared bat, western red bat, fringed myotis, big free-tailed bat, Eureka mountainsnail, Yavapai mountainsnail, boreal toad.

PONDEROSA PINE

ESA-Related Welsh's milk-vetch, Maguire daisy, Uinta Basin hookless cactus, Coral Pink Sand Dunes tiger beetle.

BLM-Sensitive Chatterley's onion, escarpment milk-vetch, basalt milk-vetch, pinnate spring parsley, Kachina daisy, Pine Valley goldenbush, Cedar Breaks goldenbush, Ostler's Ivesia, cliff jamesia, Claron pepperplant, Clark's lomatium, sandloving penstemon, Cronquist's phacelia, Lewis's woodpecker, spotted bat, Allen's big-eared bat.

RIPARIAN AND WETLAND

ESA-Related Maguire daisy, Ute ladies'-tresses, southwestern willow flycatcher, bald eagle, Mexican spotted owl, western yellow-billed cuckoo, Kanab ambersnail, fat-whorled pondsnail.

BLM-Sensitive Alcove bog-orchid, Greenwood's goldenbush, northern goshawk, black swift, bobolink, Lewis's woodpecker, American white pelican, Preble's shrew, western red bat, cloaked physa, Utah physa, longitudinal gland pyrg, desert springsnail, Hamlin Valley pyrg, bifid duct pyrg, Bear Lake springsnail, Black Canyon pyrg, sub-globose snake pyrg, southern Bonneville pyrg, northwest Bonneville pyrg, California floater, western pearlshell, boreal toad, Arizona toad, Columbia spotted frog, cornsnake, smooth greensnake.

ASPEN

ESA-Related None.

BLM-Sensitive Lori's columbine, Ownbey thistle, virgin thistle, Kachina daisy, Pine Valley goldenbush, rock violet, black swift, three-toed woodpecker, Eureka mountainsnail, Yavapai mountainsnail.

WATER

ESA-Related June sucker, humpback chub, bonytail chub, Virgin River chub, woundfin, Colorado pikeminnow, razorback sucker, Lahontan cutthroat trout, Yellowstone cutthroat trout.

BLM-Sensitive Bonneville cutthroat trout, Colorado River cutthroat trout, Virgin spinedace, least chub, leatherside chub, roundtail chub, desert sucker, bluehead sucker, flannelmouth sucker, Yellowstone cutthroat trout, cloaked physa, Utah physa, longitudinal gland pyrg, desert springsnail, Hamlin Valley pyrg, bifid duct pyrg, Bear Lake springsnail, Black Canyon pyrg, sub-globose snake pyrg, southern Bonneville pyrg, northwest Bonneville pyrg, California floater, western pearlshell.

3.4.5 Fisheries And Wildlife

For the purpose of this document, general fisheries and wildlife refers to species and groups of similar species that do not have federal status (as defined in the BLM 6840 Manual, including ESA-related species), but may have other federal and/or state protection (e.g., under the federal Migratory Bird Treaty Act or Utah State Code) and are of concern to management authorities, Native American tribes, the general public, or groups (e.g., birders, hunters, etc.) with particular interest in a species or group of species.

General fisheries and wildlife groups considered in this document include fisheries, non-game (raptors, migratory birds, small mammals, carnivores and predators and amphibians and reptiles), and big game (mule deer, Rocky Mountain elk, moose, desert bighorn sheep, Rocky Mountain bighorn sheep, pronghorn and bison). ESA-related and BLM-sensitive species are discussed separately. Scientific names and habitat associations for each of the species mentioned in this section are presented in **Table 3.5**, below. Because it is not comprised of burnable vegetation, the water cover type was not described as a vegetation community in the Vegetation section, above. However, water is valuable wildlife habitat and has the potential to be impacted by the proposed project. Accordingly, in this section (and the Special Status Species section), water is included as a habitat type.

Table 3.5 Habitat Associations for General Fish and Wildlife Species

Species	Common Name	Habitat
Fisheries		
Rainbow trout	*Oncorhyncus mykiss*	W
Brown trout	*Salmo trutta*	W
Brook trout	*Salvelinus fontinalis*	W
Birds		
Lewis' woodpecker	*Melanerpes lewis*	MS, PP, RW
Abert's towhee	*Pipilo abertii*	RW
American avocet	*Recurvirostra americana*	RW
Mountain plover	*Charadrius montanus*	SDS
Lucy's warbler	*Vermivora lucidae*	SDS, RW
Sage grouse	*Centrocercus urophasianus*	S
American white pelican	*Pelecanus erythrorhynchos*	RW, W
Bobolink	*Dolichonyx oryzivorus*	RW
Virginia's warbler	*Vermivora virginae*	PJ, MS
Gray vireo	*Vireo vicinior*	PJ, MS
Bell's vireo	*Vireo bellii*	RW
Black rosy finch	*Leucosticte atrata*	G
Long-billed curlew	*Numenius phaeopus*	G
Sharp-tailed grouse	*Tympanuchus phasianellus*	S, G
Brewer's sparrow	*Spizella breweri*	SDS, S

Species	Common Name	Habitat
Black swift	*Cypseloides niger*	RW
Black-necked stilt	*Himantopus mexicanus*	RW
Broad-tailed hummingbird	*Selasphorus platycercus*	RW
Ferruginous hawk	*Buteo regalis*	SDS, S, PJ, S, GG, B
Yellow-billed cuckoo	*Coccyzus americanus*	RW
Black-throated gray warbler	*Dendroica nigrescens*	PJ, MS
Three-toed woodpecker	*Picoides tridactylus*	MC
Sage sparrow	*Amphispiza belli*	SDS, S
Gambel's quail	*Callipepla gambelii*	SDS, RW
Red-tailed hawk	*Buteo jamaicensis*	SDS, PJ, S, G, MS, MC, A
Northern goshawk	*Accipiter gentiles*	MC, A
Golden eagle	*Aquila chrysaetos*	SDS, PJ, G, MS, MC, RW, A, W
American kestrel	*Falco sparverius*	MC, PP, RW, A
Osprey	*Pandion haliaetus*	RW, W
Northern harrier	*Circus cyaneus*	G, RW
Turkey vulture	*Cathartes aura*	SDS, PJ, S, G, B, MS, MC, PP, RW, A, W
Flammulated owl	*Otus flammeolus*	MC, PP, RW, A
Tree swallow	*Tachycineta bicolor*	MC, PP, RW, A
Black-capped chickadee	*Parus atricapillus*	MC, PP, RW, A
Mountain chickadee	*Parus gambeli*	MC, PP, RW, A
Mammals		
Mule deer	*Odocoileus hemionus*	S, MS
Rocky Mountain elk	*Cervus elaphus*	G, MS, MC, A
Moose	*Alces alces*	G, MS, MC, RW, A
Desert bighorn sheep	*Ovis canadensis nelsoni*	S, G, MS
Rocky Mountain bighorn sheep	*Ovis canadensis canadensis*	S, G, MS
Pronghorn	*Antilocapra americana*	SDS, S, G
Bison	*Bos bison*	G, MS, MC, PP, A
Silver-haired bat	*Lasionycteris noctivagans*	MC, PP, RW, A
Ringtail	*Bassariscus astutus*	MC, PP, RW, A
Black bear	*Ursus americanus*	MS, MC, PP, RW, A
Mountain lion	*Felis concolor*	PJ, MS, MC, PP
Coyote	*Canis latrans*	SDS, PJ, S, G, B, MS, MC, A

Habitat Codes: SDS = salt desert scrub, PJ = pinyon and juniper woodland, S = sagebrush, G = grassland, B = blackbrush, MS = mountain shrub, MC = mixed conifer, PP = ponderosa pine, RW = riparian/wetland, A = aspen and W = water

3.4.5.1 Fisheries

Seventy-three fish species and numerous species of mollusks and other macro invertebrates are found on BLM-administered lands in Utah. Fish species found on BLM-administered lands that are not ESA-related or BLM-sensitive include the following:

rainbow, brown, brook, and lake trout; suckers; shiners; dace; chubs; sculpins; and a variety of lesser known or less abundant species.

Native fish demonstrate a wide variety of life histories, including resident populations that inhabit small headwater streams with shorter migratory ranges, populations that use larger streams and main rivers and populations that are found in lake habitats and spawn in rivers or streams.

BLM-administered lands in Utah provide the following approximate values of aquatic habitat resources: elevation, latitude, topography, substrate, water quality and chemistry, vegetative structure, flow regimes and patterns and disturbance regimes.

BLM-administered lands in Utah provide the following aquatic habitat resources: 81,817 miles of water courses; 674,987 acres of ephemeral and permanent water bodies; 17,859 acres of wetlands; and 2,474 springs. The quality of these aquatic habitats varies widely across the state. Generally, aquatic habitats have declined since the settlement of the region began in the 1850s. Disturbances contributing to decline of habitat include logging, grazing, mining, recreation, water diversion for irrigation and domestic supply purposes, other surface disturbing activities and introduction of non-native species. Natural disturbances affecting wildlife and habitat include fire, insects, disease, wind, floods, landslides, avalanches and other surface disturbing activities. These disturbances can result in loss of riparian vegetation and subsequent changes in vegetation species composition. Disturbances have also resulted from the loss of large woody debris recruitment; conversion of riverine habitat to reservoir habitat; changes to gene pools through local extirpations; and disease.

3.4.5.2 Non-Game Species

For the purposes of this document, non-game species are identified as raptors, migratory birds, small mammals, carnivores and amphibians and reptiles.

Raptors Raptors (birds of prey) found in Utah include several species of hawks (e.g., ferruginous hawk, red-tailed hawk, and northern goshawk), eagles (e.g., golden eagle), falcons (including the American kestrel), owls, ospreys, northern harriers and turkey vultures. These species inhabit various ecosystems, from salt desert scrub to alpine, and consume a wide range of prey. During the breeding season, they are particularly sensitive to disturbance from humans or other sources. Behavior during and following disturbance could result in nest abandonment or reduced productivity. Raptors are provided with protection designed to prevent disturbance under the following federal acts: Migratory Bird Treaty Act of 1918, Eagle Protection Act of 1962 (as amended) and the Endangered Species Act of 1973 (as amended) for federally listed species. In addition, the Utah Field Office of the USFWS has issued guidelines for the establishment of disturbance-free buffer zones around raptor nests and the identification of mitigation techniques available for use when management or development activities conflict with the buffer zones. In Utah, the largest buffer zone suggested for any raptor nest is one mile (Romin and Muck 2002).

Migratory Birds Migratory birds travel from one region to another, usually periodically, for breeding or feeding purposes. Generally, they nest in temperate North America and overwinter in the New World tropics, including portions of Mexico and Latin America. Migratory birds represent a diversity of species, including shorebirds, waterfowl,

passerines (perching birds) and raptors and may nest in any or all of the vegetation types within the planning area.

The Utah Division of Wildlife Resources (UDWR) has prepared the Partners in Flight Avian Conservation Strategy, a document evaluating the status of 231 bird species, many of which are migratory, that breed in Utah. Twenty-four (24) bird species have been prioritized for management and protection and occur mostly within four habitat types that have been designated as priority habitats and correlate with Utah GAP Analysis cover types. These habitats include salt desert scrub, pinyon and juniper woodland, sagebrush and riparian and wetland (Parrish et al. 2002). The 24 priority bird species include the Lewis' woodpecker, Abert's towhee, American avocet, mountain plover, Lucy's warbler, sage grouse, American white pelican, bobolink, Virginia's warbler, gray vireo, Bell's vireo, black rosy finch, long-billed curlew, sharp-tailed grouse, Brewer's sparrow, black swift, black-necked stilt, broad-tailed hummingbird, ferruginous hawk, yellow-billed cuckoo, black-throated gray warbler, three-toed woodpecker, sage sparrow, and Gambel's quail.

Because of the wetland resources associated with Great Salt Lake, Utah is part of a prominent north-south trending flyway for migratory species. Those species that do not breed in Utah may instead use it as a stopover location to rest and refuel during migratory travel to destinations farther north or south. Over 60 percent of neotropical migrants use riparian and wetland habitat for breeding purposes or as stopover sites during migration (Krueper 1992). Approximately 0.4 percent of BLM-administered lands in Utah are riparian and wetland habitat.

Some migratory birds are cavity nesters and may be found in forested habitat of varying elevation throughout the state. Cavity nesting birds found throughout Utah include several species of woodpecker. Woodpeckers are considered primary cavity nesters because they typically excavate their own nest cavities. Secondary cavity nesters are often incapable of excavating their own nest cavities and, therefore, rely upon existing cavities previously established by woodpeckers. Secondary cavity nesters include species such as the American kestrel, flammulated owl, tree swallow and black-capped and mountain chickadees. While cavities may be excavated in live trees, standing dead trees (e.g., snags) are typically preferred by primary cavity nesters and may be easier for secondary cavity nesters to access. Trees in the mixed conifer, ponderosa pine, aspen and riparian and wetland habitat types each contain important nesting resources for cavity-nesting species.

Small Mammals Small mammals include species groups such as prairie dogs, bats, squirrels, mice and rabbits. Because these groups fill a variety of niches, small mammals are found in most habitat types within the planning area. Although the term "cavity nester" typically refers to bird species, it may also include small mammals that use tree cavities for denning purposes. Small cavity-nesting mammals include species such as the silver-haired bat and ringtail.

Carnivores and Predators These species fill a niche at the top of the food chain and are generally large, long-lived species that are solitary. Although they are considered here to be non-game species, a variety of carnivores are managed by the UDWR. More plentiful carnivores are often hunted for food or sport or as a management technique to allow prey species to thrive. Utah predators include species such as the black bear,

mountain lion and coyote. Although the black bear and mountain lion tend to remain more secluded in the mountain shrub and mixed conifer communities of mountains and foothills, coyotes may venture into urban and agricultural areas as a means of finding vulnerable prey. In general, where there is prey, there are predators. And because predators consume birds and small mammals and often travel over large distances, they may be found anywhere within the planning area.

Amphibians and Reptiles Because the majority of Utah's wildlife habitats are arid or semi-arid and such a small percentage of habitats are associated with water, reptiles are more prominent than amphibians. Reptiles are found throughout the state in nearly every habitat type. Amphibians are found in and adjacent to wetlands, rivers and streams, mountain lakes, runoff pools in rock formations and both ephemeral and permanent livestock watering ponds.

3.4.5.3 Big Game Species

Big game includes large, hunted animals such as mule deer, Rocky Mountain elk and pronghorn. Given the economic importance of big game, this group is typically managed more closely than other wildlife groups. Accordingly, the UDWR has identified critical seasonal use ranges within the planning area for the following big game species: mule deer, Rocky Mountain elk, moose, desert bighorn sheep, Rocky Mountain bighorn sheep, pronghorn and bison. **Table 3.6** below shows big game species and the acres and percent of use areas per species, within the planning area. These acreages refer only to those big game habitats that are considered most important by the UDWR.

Table 3.6 Big Game Seasonal Use Areas Within the Planning Area

Seasonal Use Range & Rank	Planning Area Acres	% Use Areas per Species
Mule Deer		
Summer Critical	140,885	0.8
Winter Critical	2,031,808	11.0
Rocky Mountain Elk		
Summer Critical	99,549	0.5
Winter Critical	5,855,237	31.8
Year-Long Critical	13,849	0.1
Moose		
Winter Critical	3,969	0.0
Year-Long Critical	1,154	0.0
Desert Big Horn Sheep		
Year Long Critical	1,478,893	8.0
Rocky Mountain Big Horn Sheep		
Year Long Critical	251,018	1.4
Pronghorn		
Winter Critical	108,346	0.6
Year Long Critical	321,089	1.7
Bison		
Year Long Critical	277,249	1.5

Mule Deer Mule deer occupy most ecosystems in Utah, but are characteristically found in shrublands with rough, broken terrain and abundant browse and cover. Mule deer winter diets consist primarily of browse in the form of sagebrush, bitterbrush, mountain mahogany, and other shrubs, as wells as a small amount of grasses and trees (e.g., pinyon or juniper). During the other three seasons, there is much more equitable distribution of nutritional resources. Mule deer summer use habitat primarily consists of mixed conifer, aspen, riparian and wetland and grassland, while winter habitat primarily consists of low-elevation sagebrush or sagebrush and mountain shrub habitats on south-facing slopes.

Rocky Mountain Elk The Rocky Mountain elk is a generalist, feeding on forbs and grasses during the spring and summer and grasses and shrubs throughout the fall and winter. These feeding relationships are variable and depend largely on location. Various habitat types include winter ranges, calving areas and summer ranges. Calving areas are used from mid-May through June. They are typically located at higher elevations than wintering grounds; consist of grassland, mountain shrub, mixed conifer and aspen; and occur near cover, forage and water resources (Fitzgerald et al. 1994).

Moose The moose in Utah is typically associated with riparian and wetland and mountain shrub habitats. It feeds on leafy plants, as well as trees and shrubs including aspen, birch and willow. Before 1918, moose did not readily occur in Utah. Since that time, moose populations have increased and they are found throughout the northern portions of Utah, in places closely associated with mixed conifer, aspen, mountain shrub, riparian and wetland and grassland habitats (Zeveloff and Collette 1988).

Desert and Rocky Mountain Bighorn Sheep Bighorn sheep inhabit remote, mountain and desert locations across Utah, on cliffs and rocky slopes in rugged canyons. They are most closely associated with sagebrush, grassland and mountain shrub habitats (Chapman and Feldhamer 1982). Bighorn sheep are active during the daytime and feed on grasses, trees and shrubs, depending upon availability, succulence and nutrient content. Two subspecies of bighorn have important seasonal use areas within the planning area: desert and Rocky Mountain. The desert bighorn sheep is found in the central and southern part of the state, as well as some of the West Desert mountain ranges. The Rocky Mountain bighorn sheep can be found in several mountain ranges in central and northern Utah (UDWR 2004).

Pronghorn The pronghorn is typically associated with salt desert scrub, sagebrush and grassland habitats in Utah and throughout its entire range (American Museum of Natural History 2004; Biological and Conservation Database 2002; Burt and Grossenheider 1980). They are most active during the daytime and consume sagebrush, thistles, cacti, grasses and forbs (American Museum of Natural History 2004; Biological and Conservation Database 2002; Burt and Grossenheider 1980). There are 24 Pronghorn Management Units within the state. Pronghorn population levels are subject to climatic conditions, such as drought, and most units have suffered a substantial population decline during the current six-year drought. Pronghorn populations are expected to rebound as the drought subsides.

Bison In Utah, the bison is found in grassland, mountain shrub, mixed conifer, ponderosa pine, and aspen habitat. It grazes primarily on common grasses, but also consumes other available vegetation. Historically, it ranged over a much larger area than it does

today. Due to hunting and habitat alteration, its historic number and range size have decreased dramatically. It is still found in several areas of Utah, including the Henry Mountains and Antelope Island. They are hunted on a limited and controlled basis (UDWR 2004).

3.4.6 Cultural Resources

Cultural resources are locations where prehistoric (predating written history) or historic (older than 50 years but within written history) human habitation or other use has occurred. These resources include archaeological, historic and architectural sites important to scientific research or preservation and interpretation. These resources may also include traditional cultural properties and religious sites important to Native American and other cultural groups. A number of legislative acts and Executive Orders provide the procedures and guidelines used by federal agencies to determine potential project-related effects on cultural resources. Other requirements and provisions for protection and management are described by the National Historic Preservation Act, as amended; American Religious Freedom Act, Archaeological Resources Protection Act; Executive Order 13007 (Indian Sacred Sites); National Programmatic Agreement, 10-01-97; and the Utah State Protocol Agreement, 3-7-01.

Section 106 of the NHPA and its implementing regulations (36 CFR 800), require federal agencies to take into account the effects of their undertakings on historic properties. These regulations define a historic property as "any prehistoric or historic district, site, building, structure or object included in or eligible for inclusion in, the National Register of Historic Places...," (36 CFR 800.14). This definition also encompasses artifacts, records and remains related to such properties.

Ten Areas of Critical Environmental Concern (ACECs) within the planning area have been established due to their cultural importance and relevance (**Table 3.7**).

Table 3.7 ACECs, Acreages and Preservation Intent and Values

ACEC	Acres	Field Office	Preservation Intent and Values
Central Pacific Railroad	5,019	Salt Lake	Cultural and historical
Alkali Ridge	35,890	Monticello	Archaeological
Cedar Mesa	323,760	Monticello	Archaeological, scenic, primitive recreation
Hovenweep	1,500	Monticello	Archaeological, riparian
Shay Canyon	1,770	Monticello	Archaeological, riparian
Canaan Mountain	31,355	St. George	Scenic, cultural
Little Creek Mountain	19,305	St. George	Archaeological
Lower Virgin River	1,822	St. George	Endangered fish, archaeological
Santa-Clara-Gunlock	1,998	St. George	Riparian, archaeological
Santa-Clara-Land Hill	1,645	St. George	Riparian, archaeological

In addition to these cultural resource management designations, there are 46 National Register of Historic Places (NRHP) properties and four National Historic Trails that are located wholly or partially on BLM-administered lands (**Table 3.8**) It should be noted that some of these properties occur in more than one region and therefore are listed more than once.

Table 3.8 National Register of Historic Places and National Historic Trails Associated with BLM Utah

Salt Lake Region	
Central Pacific Railroad Grade	Lower Bear River Archaeological District
Lincoln Highway	GAPA Launch Site and Blockhouse
Wendover Air Force Base	Iosepa Settlement Cemetery
California Trail	Pony Express Trail
Moab Region	
Alkali Ridge	Pinhook Battleground
Denver and Rio Grande Lime Kiln	Hole-in-the-Rock Trail
Julien, Denis, Inscription	Lathrop Canyon Mine I
Old Spanish Trail	
Richfield Region	
Pharo Village – 42Md180	Mountain Home Wash - 42Md53
Paleo-Indian (Folsum) Camp Site - 42Md300	Desert Archaic Site - 42Md284
Gooseberry Archaeological District - 42Sv633	Elijah Cutler Behunin Cabin - UT 24
Horseshoe Canyon Pictograph Panel	Cathedral Valley Corral Structure
Cowboy Caves - 42Wn420	Civilian Conservation Corps Powder Magazine
Bull Creek Archaeological District	Hanks' Dugouts
Fremont Field Camp - 42Pi159	Morrell, Lesley, Line Cabin and Corral
Gunnison Massacre Site	Oyler Mine
Robber's Roost	Pioneer Register
Black Rock Station Petroglyphs Sites	East and West Tintic Historic Mining Districts
Cottonwood Wash - 42Md183	Desert Experimental Station
Deseret - 42Md55	Topaz War Relocation Center Site
Pony Express Trail	
Cedar City Region	
Friendship Cove Pictograph	Long Flat Site
Hole-in-the-Rock Trail	Parowan Gap Petroglyphs
Oak Creek Dam	Cottonwood Canyon Cliff Dwelling - 42Ka1504
Pole Hollow Archeological Site	Hole-In-The-Rock Trail
Starr Ranch	Fort Pearce
Caretaker's Cabin	Parunuweap Canyon Archaeological District
Gold Spring	

The BLM's 21 LUPs for the Salt Lake, Richfield, Moab and Cedar City support centers describe cultural site types and general distribution throughout the individual planning areas. This information has been summarized from known cultural resources sites and does not account for areas that have not been surveyed for cultural resources. **Appendix E** describes the prehistoric, historic and traditional cultural and religious site types known to occur upon public lands within the state.

3.4.6.1 Prehistoric Resources

Thousands of archaeological sites representing more than 12,000 years of human occupation have been recorded on public land within the state. Many cultural manifestations, including Paleo-Indian; Early, Middle and Late Archaic; Ancestral Puebloan (Anasazi and Fremont); historic Ute and Paiute; Navajo; and historic European, indicate that many culture groups have occupied this area more or less continuously. The locations of sites vary due to the unique landforms and environments across the state. In studies to date, Paleo-Indian sites are limited in number. Likewise, Early and Middle Archaic sites may be limited in number and evenly distributed, while Late Archaic sites are more common and again are more or less evenly distributed.

Prehistoric sites in the Basin and Range Province in the north and northwest portion of the state tend to concentrate near seeps and springs in desert mountain ranges and along perennial mountain streams and rivers. They include properties as diverse as rock shelters (such as Lakeside Cave), hunting camps, lithic scatters, obsidian and other lithic sources and rock art. In the Rocky Mountain Province and near the Uintah Basin of the Colorado Plateau Province of northeastern Utah, the primary known prehistoric sites include rock art, open camps and villages, platform sites, rock shelters and caves, architectural sites, artifact scatters, resource procurement sites, ceremonial sites, isolated features, trails and landscapes. The majority of these prehistoric sites tend to also be concentrated near seeps and springs in mountain ranges. The upper plateaus and benches of the region, as well as lower canyon corridors contain high densities of cultural resource sites. These areas often include sites deemed to be at high risk from fire effects.

Numerous prehistoric archaeological sites representing at least 11,000 years of human occupation have been recorded on public lands within the Colorado Plateau Province region of southern Utah. Prehistoric sites tend to concentrate near seeps, springs, within canyons, along perennial streams including locations where water occurred prehistorically. Sites have also been located within upland areas, including knolls and buttes and include properties as diverse as alcoves and rock shelters, open camps, tool production and procurement areas, gathering and subsistence locations, pithouse habitations, coursed masonry architecture, water control devices and rock art, among others.

Anasazi sites are concentrated within the southern region of Utah, while Fremont Culture sites are more concentrated in the northern portions of the region. Historic Native American sites are sometimes difficult to distinguish and can be found almost anywhere. Within the northern portion of this region, properties include a Paleo-Indian camp site, archaic seasonal sites and the later Formative Fremont (Pharo Village) and Anasazi sites. Prehistoric Numic as well as historic Paiute sites can been found in this area. These sites consist of seasonal camps, habitation sites, antelope traps, rock art and one known prehistoric burial. Central Utah is noted for its early Fremont sites and numerous rock art panels and sites as well as its transition into Anasazi territory.

3.4.6.2 Historic Resources

Historic resources in northwest Utah pertain primarily to exploration, migration, and transportation routes, as well as mining, ranching, and military activities. These activities began as early as 1776 with the Dominguez and Escalante expedition, which dates to

the period of Spanish/Mexican exploration. Fur trappers entered the area in the 1820s and sporadically used the area for hunting, rendezvous and caching furs. The first permanent Euro-American settlers arrived in the area in 1847. Historic sites in this region include ghost towns, burials and cemeteries, historic ranches, mining sites, and numerous historic trails and wagon trails. Segments of two Congressionally Designated National Historic trails, the California Trail and the Pony Express/Stagecoach Overland Trail are located in the region. BLM manages a number of locations as interpretative sites along the Pony Express and Overland Stage Line, such as Canyon Station and Simpson Springs. The Hastings Cutoff, the Bidwell-Bartleson Trail, the Salt Lake Cutoff, the Midland Trail, the Lincoln and Victory Highways also traverse the region. Numerous mining "ghost towns" and other abandoned settlements occur throughout the area, such as Ophir, Mecur, and Tintic.

Many resources, such as the National Register-listed Transcontinental Railroad Corridor and its associated features consisting of trestles, culverts, sidings and construction camps are considered historically significant and are mostly accessible to the public. The Central Pacific Grade is considered an ACEC. Another area of concern is the Pilot Range, which contains an historic mining tram, mining activity areas, and a number of historic trails. The desert ranges and mudflats have been used by the military since World War II for bombing and strafing ranges, as well as emergency landing fields, gunnery training ranges, missile test areas, and other military training and test sites. Roads, structures and work camps constructed by the Civilian Conservation Corps (CCC) are also present.

Historic resources in West Central and Central Utah include ghost towns, burials, cemeteries, historic ranches, mining districts, logging sites, and numerous historic trails and wagon trails. There are many resources pertaining to mining in the East and West Tintic Historic Mining Districts.

Many resources, such as the National Register-listed Desert Experimental Station and sites associated with Butch Cassidy are considered historically interesting and significant. During the 1930's, the Civilian Conservation Corps did hundreds of projects in the region. These projects included road construction, trail improvements and campground development. A WWII Internment Camp was constructed near Delta to house Japanese-Americans. During its existence, Topaz was the fifth largest community in Utah. Some types of historic sites (small dump sites, roads, etc.) are quite common and are generally concentrated near communities.

Historic resources in Southeast region include ghost towns, burials, cemeteries, historic ranches, mines, logging sites and numerous historic trails and wagon roads. Resources pertaining to Euro-American settlement date from 1847 in the Moab FMP Region. Mining sites such as the ACECs; Copper Globe, Muddy Creek and Temple Mountain Historic District are considered historically significant. Roads and structures constructed by the Civilian Conservation Corps (CCC) are also present. Historic European sites tend to be concentrated near towns and settlements, but can be found almost everywhere.

Historic resources in Southwestern Utah primarily relate to Spanish, Mexican, and Euro-American activities since 1776 and include ghost towns, burials, cemeteries, historic ranches, and numerous historic trails and wagon trails, such as the Spanish Trail and the California Immigrant Trail. Some historic trails, such as the 1776 Dominguez and

Escalante Trail and the Old Spanish Trail date to the period of Spanish/Mexican exploration. Resources pertaining to mining, and Euro-American settlement date from 1847, and numerous "ghost towns" (i.e., abandoned settlements) occur throughout the region. Roads and structures constructed by the Civilian Conservation Corps (CCC) are also present.

3.4.6.3 Places of Traditional Cultural Importance

Within the context of the NHPA, a Traditional Cultural Property (TCP) is a property that may be eligible for inclusion on the NRHP due to its association with the cultural practices or beliefs of a living community. The eligibility is also dependent upon these practices or beliefs having been passed down through the generations and being important to the preservation of the group's cultural identity and integrity. Because these properties are not usually recognizable to an outsider through archaeological or historical investigations, the existence and locations of TCPs may often only be identified through consultation with members of the groups who ascribe value to those places. Many Native American belief systems require that the identity and location of TCPs not be divulged. Accordingly, the BLM has committed to keep information regarding these resources confidential to the fullest extent allowed by law. However, though not identified in this public document, TCPs identified through the consultation process will be considered as part of the NEPA process.

3.4.6.4 Native American Consultation

The BLM is in the process of consulting with Tribal groups who have expressed an interest in all or part of the public lands within the state of Utah. This consultation is being carried out to provide an opportunity for tribes to identify any places of traditional religious or cultural importance relevant to the project. Several site types, both archaeological and non-archaeological, may be identified by Native American groups as traditional cultural properties (TCPs). Places that may be of traditional importance to Native American peoples include, but are not limited to, locations associated with traditional beliefs concerning origin(s), cultural history or the nature of the world and locations where religious practitioners go or have gone to perform ceremonial activities based on traditional cultural rules of practice, ancestral habitation sites, trails, burial sites and places from which plants, animals, minerals and waters were collected.

3.4.7 Visual Resources

Visual resources on BLM-administered lands in Utah are classified according to BLM guidelines governing Visual Resource Management (VRM) (BLM 2004y). These classes (I, II, III and IV) have been established in the existing LUPs (BLM 2004y). Total acreages for each VRM class within the planning area include approximately 438,185 Class I acres (three percent of total), 2,713,595 Class II acres (16 percent of total), 3,235,775 Class III acres (19 percent of total) and 10,523,668 Class IV acres (62 percent of total). (Acreage estimates do not include data for Iso-tract MFP, Park City MFP, Randolph MFP and House Range RMP areas due to insufficient VRM acreage data.)

Determination of these four classes is based on aesthetic quality of an area, viewing distances and public sensitivity to changes in the existing landscape. VRM quality is managed according to the objectives set forth in the following VRM class descriptions:

- Class I: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes and some management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- Class II: The objective of this class is to retain the character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape.
- Class III: The objective of this class is to partially retain the existing character of the landscape. The level of activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- Class IV: The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. Every attempt should be made, however, to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements.

Because they are the most scenic and sensitive, Class I areas generally include special designation management areas such as Wilderness or ACECs. Class II areas generally include canyon and mountain vistas of particular importance, as well as less strictly managed special designation management areas. Class III areas generally act as a buffer to protect more sensitive areas or important vistas. They are typically found along major travel corridors or adjacent to Class I and II areas. Areas that do not fit into Classes I–III are considered Class IV areas.

3.4.8 Naturalness, Solitude And Primitive Recreation

3.4.8.1 Non-Wilderness Study Areas (WSAs) with Wilderness Characteristics

Since the WSAs were established (Special Designations section), Utah wilderness has become a national issue. For more than 20 years, the public has debated which lands have wilderness characteristics and should be considered for Wilderness designation. In 1996, the Secretary of the Interior directed the BLM to take another look at some of the lands in question. In response to the Secretary's direction, the BLM inventoried these lands and found approximately another 2.6 million acres of public land statewide outside of existing WSAs to have wilderness characteristics (BLM 1999). As a result of a 2003 agreement to settle a lawsuit, the BLM's authority to designate new WSAs has expired; yet, the BLM does have the authority to conduct inventories for values associated with wilderness characteristics and consider management of these values in its land use planning process.

There are 122 areas that have been identified as having wilderness characteristics within the land use plan areas in the Salt Lake, Fillmore, Richfield, Cedar City, Kanab, Moab and Monticello Field Offices and within the GSENM (BLM 1999). These non-WSA

lands with wilderness characteristics are currently managed according to the existing land use plans, which do not address wilderness characteristics. These areas total about 2 million acres of public land that are generally contiguous or near existing WSAs. **Table 3.9** lists non-WSAs with wilderness characteristics and acreage by Field Office.

Table 3.9 Non-WSAs with Wilderness Characteristics and Acreage by Field Office.

Planning Office	Acreage
Salt Lake	164,740
Richfield	511,216
Fillmore	56,990
Moab	210,070
Monticello	484,830
Kanab	60,580
Cedar City	68,000
St. George	80,850
GSENM	399,980
TOTAL	**2,037,256**

The inventory evaluated wilderness characteristics as discussed in Section 2 (c) of the Wilderness Act of 1964, which Congress incorporated in FLPMA, Sec. 603 (43 USC 1782). These wilderness characteristics areas are further defined as areas of undeveloped public land retaining its primeval character and influence, and as having outstanding opportunities for solitude or primitive and unconfined-type recreation. The 1999 *BLM Utah Wilderness Inventory* and 1999 *BLM Utah Wilderness Inventory Revision Documents for Moab, Monticello and Richfield* provide detailed descriptions of the 122 non-WSA areas with wilderness characteristics (**Table 3.9**).

3.4.8.2 Non-WSA Lands Likely to Have Wilderness Characteristics

The public has submitted information to the Utah BLM suggesting that areas not specifically identified during the 1999 *Utah Wilderness Inventory* managed by the Salt Lake, Fillmore, Richfield, Moab, Monticello, Cedar City, Kanab, and St. George Field Offices and GSENM have wilderness characteristics and therefore, should be managed to preserve those values. The BLM evaluated and assessed the information and determined that 24 areas, totaling 250,617 acres, are likely to have wilderness characteristics. **Table 3.10** below describes by field office the acreage found likely to have wilderness characteristics.

Table 3.10 Non-WSA Lands Likely to Have Wilderness Characteristics

Planning Office	Acreage by Field Office
Salt Lake	0
Richfield	192,940
Fillmore	0
Moab	50,157
Monticello	7,520
Kanab	0

Planning Office	Acreage by Field Office
Cedar City	0
St. George	0
GSENM	0
TOTAL	**250,617**

3.4.9 Forestry

Most existing wood product use is for firewood, Christmas tree and pine nut gathering, with a minor component being for lumber and associated products. An estimated six million acres of forest and woodland occur within all of the BLM-administered land in the state. No stand delineations have been performed within the state with the exception of a minor amount in the Vernal Field Office area, which is outside of the planning area. The last known timber sale on record was in the 1960s (Radigan 2004). Forest and woodland objectives in current RMP revisions include commercial utilization of forest and woodland products. Additional BLM program development for forest and woodlands is ongoing (BLM Forest and Woodland Management Action Plan 2003c).

Table 3.11 shows the occurrence of forest types (the forest types correspond to the compressed GAP classes used in the vegetation section of this chapter), acreages for the planning area and primary uses of the forests.

Table 3.11 Forest Types, Acres, and Primary Uses

Forest Type	Planning Area Acres	Primary Uses
Mixed Conifer	98,568 (<1 percent)	Firewood, Christmas trees, pulp, lumber, log home construction, fence posts
Pinyon and Juniper Woodland	4,730,736 (26 percent)	Firewood, specialty lumber, pine nuts, biomass
Aspen	22,801 (<1 percent)	Packing material (dunnage), pallets, erosion blanket, swamp cooler filters, matches, specialty lumber, fuelwood and fence posts, pulp
Ponderosa Pine	81,402 (<1 percent)	Lumber, fuelwood, log home construction and fence posts

As shown in the table, the predominant forest type in the planning area is the pinyon and juniper woodland category. This is the most extensive forest type in Utah, exceeding in acreage all other forests combined (Lanner 1984). Efforts have been made to encourage the non-commercial thinning of pinyon and juniper woodland for firewood use. The mixed conifer is comprised of fir, pine and spruce species.

Old growth forests are generally defined as being older than 150 years old. The primary forest type identified within the planning area as likely to have old growth areas is the pinyon and juniper woodland. Harvesting or other activities affecting old growth forests are generally restricted. As presented in Chapter 2, a DWFC for fire treatments is to create a landscape of diverse age-classes among forest types while retaining patches of old growth forest where possible.

3.4.10 Livestock Grazing

Livestock grazing is permitted on approximately 93 percent (21,345,629 acres) of BLM-administered lands in Utah. For administrative purposes, Utah is divided into 1,400 allotments.

Grazing allotments are geographically unique and range in size from 200,000 public acres to small isolated parcels of public land of less than 40 acres. Sizing affects how the allotments are managed. Allotments with large blocks of contiguous BLM land are minimally impacted by surrounding private land. The isolated tracts are often a small component of a larger private land holding. Administrative access to these small tracts of public land sometimes exists only because of the grazing permit or lease. Allotments may include private, state, other federal lands or a combination thereof, in addition to BLM-administered lands. Allotments may be permitted to one (individual allotment) or more (common allotment) operators. Currently, 1,546 permits are issued to livestock operators (more than one permit may be issued to a particular individual or company) to authorize grazing on the 1,400 allotments. Grazing permits convey no right, title or interest in the public lands and their resources.

Grazing use by livestock is measured in terms of animal unit months (AUMs). One AUM is equal to the amount of forage used to support one cow and calf for one month (approximately 800 pounds of forage). Active preference, the amount of AUMs currently authorized for use on BLM-administered lands in Utah, is 875,579 AUMs for cattle, 342,465 AUMs for sheep and 2,866 AUMs for domestic horses, totaling 1,220,910 AUMs annually.

Seasons of use vary on each allotment throughout the state from a few-week season to a yearlong season. Each allotment may have a number of pastures that are grazed in a rotation system. A deferred rotation grazing system rotates livestock use (e.g., livestock start and end in different pastures each year) through several pastures. A rest rotation grazing system includes a full year or more of rest for one or more pastures within the allotment. Each grazing system may include periodic rest depending upon the specific management concerns and needs for that allotment. The season of use for each allotment is described in the operator's grazing permit. Season-long use entails grazing one pasture from spring or early summer to late summer or fall. Some movement of livestock use may occur within the pasture (e.g., from canyon to canyon). Deferred rotation is a technique that uses the entire allotment by rotating pasture use (e.g., livestock start in a different pasture each year). Rest-rotation of pastures is a technique that involves grazing during certain periods and resting during other periods, with some pastures rested for the entire grazing season. Grazing systems are designed based on the requirements of key forage species in the allotment, the resources of concern on the allotment and the needs of the livestock producer and their livestock. These periods of use are referred to as treatments and may be rotated so that no pasture receives the same use every year. Allotments are periodically assessed for meeting multiple use objectives and all allotments are currently being assessed for meeting Utah's Rangeland Health Standards. This effort is to be completed by the year 2009. Periodic allotment assessments may indicate that changes in the season of use are necessary to meet rangeland health standards. Seasons of use are allotment-specific and may be managed as season-long or using a grazing system (e.g., rest rotation, deferred). If these assessments indicate that changes in livestock management are needed to

meet the appropriate standards or other multiple use objectives after consultation with the permittee, changes to the terms and conditions of the permit would be made through agreement or by decision.

3.4.11 Recreation and Visitor Services

BLM-administered lands in Utah offer a variety of recreation opportunities including, but not limited to, camping, hunting, fishing, hiking, horseback riding, sightseeing, wildlife viewing, rock climbing, mountain bicycling, caving, river running, sailing and off-highway driving. The Utah BLM manages 45 recreation sites throughout the state (BLM 2004a). These include 9 interpretive facilities and ranger stations, 3 recreation areas and 26 sites with developed campgrounds or other sanitary services such as restrooms, or drinking water infrastructures. Most of BLM-administered lands are available for dispersed (undeveloped) recreation, which is recreation not related to a managerial site and cannot be measured as occurring in any one particular place.

Recreational use is counted as visitor use and is measured in "visitor days." A visitor day represents one person doing an activity for all or part of one day. For example, if one person spent one night camping on public lands, it is counted as two visitor days. **Table 3.12** displays visitor use in Utah (including Price and Vernal Field offices) based on the number of special recreation permits issued and an estimation of visitor days resulting from dispersed (non-permitted) recreation.

Table 3.12 Recreation Use on BLM-Administered Lands in Utah (2000)

Activity	Visitor Days
Camping	2,420,015
Driving for Pleasure Activities	312,554
Educational Opportunity Activities	1,867,544
Fishing and Hunting Activities	255,866
Miscellaneous Land Activities	75,133
Miscellaneous Water Activities	625,573
Picnicking Activities	109,477
Specialized Sporting Activities	25,645
Trail Related Activities	2,015,006
Winter Activities	5,120
Other	99,682
TOTAL	**7,811,615**

Source: BLM 2000

Table 3.13 lists developed recreation sites in Utah, excluding those covered by the Vernal and Price field offices. These developed recreation areas may include such permanent features as:

- Picnic tables
- Drinking water facilities
- Vault toilets and shower facilities
- Shade structures

- Parking lots with traffic flow controls such as striping, islands, boulders and rope fences
- Water drainage systems
- Signage, including maps, brochures, speed limits, recreation safety, unexploded ordnance warnings, wildlife and noxious weed information
- Bulletin boards and visitor registration and fee stations
- Traffic counters

3.4.12 Special Designations

Special designations consist of two types: administrative and congressional. For the purposes of this section, administrative designations are divided into four categories: Wilderness areas; Wilderness Study Areas; Areas of Critical Environmental Concern; and other administrative designations including Research Natural Areas (RNAs), Outstanding Natural Areas (ONAs), Natural Environmental Areas, National Monuments, National Natural Landmarks, National Scenic Byways and Wild and Scenic Rivers. Congressional designations are divided into two categories: National Conservation Areas (NCAs) and National Historic Trails. Each designation is discussed in the land use plans that are identified in the beginning of this document and is incorporated by reference. **Table 3.14** lists administrative and congressional designations found within the planning area.

Table 3.13 Developed Recreation Sites in Planning Area

Site name	Field Office	Recreation Features
Bonneville Salt Flats/ Silver Island Mountains	Salt Lake	OHV trails, mountain biking and a scenic byway
Central Pacific Transcontinental RR Grade	Salt Lake	Mountain biking, scenic byway, interpretive site/trail
Clover Spring	Salt Lake	Camping, hiking, equestrian facility, fishing
Pony Express Trail/Simpson's Springs	Salt Lake	Camping, hiking, picnicking, mountain biking, wildlife viewing, scenic byways, interpretive site/trail
Knolls Special Recreation Management Area (SRMA)	Salt Lake	OHV trails, play area
Birch Creek Campground	Salt Lake	Year-round camping
Deep Creek Mountains	Fillmore	Picnicking, Hiking, Scenic Byway
Little Sahara Recreation Area	Fillmore	Year-round camping
West Desert Rockhounding Area	Fillmore	Hiking, rockhounding
Yuba Reservoir	Fillmore	Camping, picnicking, fishing, boating, OHV trails
Tabernacle Hill/Pavant Butte	Fillmore	Hiking, wildlife viewing
Parowan Gap	Cedar City	Scenic views, listed on National Register of Historic Places
Rock Corral Campground	Cedar City	Camping
Joshua Tree National Landmark	St. George	Wildlife viewing, scenic byway
Baker Dam	St. George	Camping, fishing
Red Cliffs/Sand Mountain	St. George	Camping, hiking, OHV trails, wildlife viewing
Smithsonian Butte/Cannan Mountain	St. George	Hiking, wildlife viewing, scenic byway

Site name	Field Office	Recreation Features
Hog Springs	Richfield	Picnicking, hiking, wildlife viewing
Henry Mountains	Richfield	Camping, picnicking, hiking, mountain biking, wildlife viewing, scenic byway
Lonesome Beaver Campground, Henry Mountains	Richfield	Camping
McMillan Springs Campground, Henry Mountains	Richfield	Camping
Starr Springs Campground, Henry Mountains	Richfield	Camping
Koosharem Reservoir/Piute ATV Trail	Richfield	OHV trail, play area, fishing
Otter Creek Reservoir	Richfield	Fishing, OHV play area, wildlife viewing
Piute Reservoir/Piute ATV Trail	Richfield	Fishing, OHV play area, wildlife viewing
Wolverton Mill	Richfield	Picnicking, scenic byway, ranger station
Paria River	Kanab	Camping, picnicking, ranger station, hiking, wildlife viewing, scenic byway
White House Trailhead	Kanab	Year-round hiking
Ponderosa Campground	Kanab	Camping
Coral Pink Sand Dunes	Kanab	Picnicking, camping, OHV use
Canyons of the Escalante	GSENM	Camping, Hiking, Biking, Equestrian, OHV use
Paria Canyon/River	GSENM	Camping, Hiking, Biking, Equestrian, OHV use
Westwater Canyon	Moab	Camping, ranger station, boat ramp, fishing, wildlife viewing
Sand Flats/Moab Slickrock Bike Trail	Moab	OHV trail, mountain biking, wildlife viewing
Canyon Rims Recreation Area	Moab	Camping, hiking, mountain biking
Colorado Riverway	Moab	Camping, hiking, fishing, picnicking, OHV trails, boat ramp, wildlife viewing, interpretive trail/site, scenic byway
Mill Canyon/Copper Ridge Dinosaur Tracks	Moab	Mountain biking, interpretive trail/site
Labyrinth Canyon	Moab	Boating, fishing
San Juan River Island Campground	Monticello	Camping, picnicking, year-round boating, fishing, wildlife viewing, scenic byway
Mule Canyon/Butler Wash	Monticello	Hiking, scenic byway, wildlife viewing
Grand Gulch Plateau	Monticello	Camping, hiking, ranger station, wildlife viewing, interpretive trail/site, scenic byway
Hamburger Rock Campground	Monticello	Year-round camping
Hatch Point Campground	Monticello	Camping
Wind Whistle Campground	Monticello	Camping
Comb Wash Campground	Monticello	Year-round camping
Canyon Rims Recreation Area	Monticello	Camping, picnicking, hiking, OHV trails, wildlife viewing, scenic byway, interpretive trail/site
Deer Creek Campground	GSENM	Camping

Site name	Field Office	Recreation Features
Calf Creek Campground	GSENM	Camping
Source: BLM 2000		

Table 3.14 Administrative and Congressional Designations within the Planning Area

Administrative Designations			
Wilderness Areas	**Acres/Miles**	**Location**	**Land Use Plan**
Black Ridge Canyons	5,120	Moab Field Office boundary, managed by Grand Junction Field Office, Colorado	Grand RMP
Beaver Dam Mountains	2,600	St. George Field Office (also Arizona Strip Field Office, Arizona)	St. George RMP
Paria Canyon-Vermilion Cliffs	20,000	Kanab Field Office (also Arizona Strip Field Office, Arizona)	Paria MFP
TOTAL	**27,720**		
Areas of Critical Environmental Concern	**Acres**	**Relevant & Important Values**	**Field Office, LUP**
Fossil Mountain	1,920	Geological	Fillmore, Warm Springs RMP
Gandy Mountain Caves	1,120	Geological	Fillmore, House Range RMP
Gandy Salt Marsh	2,270	Biological, Riparian, T&E	Fillmore, House Range RMP
Pavant Butte	2,500	Geological, Fish and Wildlife	Fillmore, House Range RMP
Rockwell ONA	9,630	Geological	Fillmore, Warm Springs RMP
Tabernacle Hill	3,567	Geological	Fillmore, Warm Springs RMP
Wah Wah Mountains	5,970	Botanical, Geological	Fillmore, Warm Springs RMP
Water/South Fork Indian Canyon	225	Watershed, Botanical, Riparian	Kanab, Vermilion MFP
Negro Bill Canyon ONA	1,375	Scenic, Sensitive Plants, Riparian	Moab, Grand RMP
Alkali Ridge	35,890	Archaeological	Monticello San Juan RMP
Bridger Jack Mesa	5,290	Botanical	Monticello San Juan RMP
Butler Wash	13,870	Scenic	Monticello San Juan RMP

Cedar Mesa	323,760	Cultural Resources, Scenic, Riparian	Monticello San Juan RMP
Dark Canyon	62,040	Scenic, Fish and Wildlife	Monticello San Juan RMP
Hovenweep	1,500	Cultural Resources, Riparian	Monticello San Juan RMP
Indian Creek	8,640	Scenic	Monticello San Juan RMP
Lavender Mesa	640	Botanical	Monticello San Juan RMP
Scenic Highway Corridor	78,390	Scenic	Monticello San Juan RMP
Shay Canyon	1,770	Cultural Resources, Riparian	Monticello San Juan RMP
Beaver Wash Canyon	3,436	Fish and Wildlife, Botanical, Riparian	Richfield, Henry Mountain MFP
Gilbert Badlands	3,680	Geological	Richfield, Henry Mountain MFP
North Caineville Mesa	2,200	Botanical, Scenic	Richfield, Henry Mountain MFP
South Caineville Mesa	4,200	Botanical	Richfield, Henry Mountain MFP
Blue Springs Wildlife Habitat Area	5,715	Fish and Wildlife, Riparian	Salt Lake, Box Elder RMP
Bonneville Salt Flats	30,203	Geological	Salt Lake, Pony Express RMP
Central Pacific Railroad	5,019	Cultural Resources	Salt Lake, Box Elder RMP
Donner/Bettridge Creek	1,120	Fish and Wildlife, Riparian, Watershed	Salt Lake, Box Elder RMP
Horseshoe Springs	760	Fish and Wildlife, Riparian	Salt Lake, Pony Express RMP
Lake Town Canyon	8,389	Watershed, Riparian	Salt Lake, Randolph MFP
Salt Wells Wildlife Habitat Area	5,389	Fish and Wildlife, Riparian	Salt Lake, Box Elder RMP
Beaver Dam Slope	48,519	Desert Tortoise, Desert Ecosystem	St. George, St. George RMP
Canaan Mountain	31,355	Scenic, Cultural	St. George, St. George RMP
Little Creek Mountain	19,305	Archaeological	St. George, St. George

			RMP
Lower Virgin River	1,822	Endangered Fish, Archaeological	St. George, St. George RMP
Red Bluff	6,168	Scenic, Endangered Plants, Erosive Soils	St. George, St. George RMP
Red Mountain Face	4,854	Scenic	St. George, St. George RMP
Santa-Clara-Gunlock	1,998	Riparian, Archaeological	St. George, St. George RMP
Santa-Clara-Land Hill	1,645	Riparian, Archaeological	St. George, St. George RMP
Upper Beaver Dam Wash	33,063	Riparian, Watershed, Listed Species Habitat	St. George, St. George RMP
Warner Ridge/Fort Pearce	4,281	Endangered Plants, Riparian	St. George, St. George RMP
TOTAL	**783,488**		
Research Natural Areas, Outstanding Natural Areas and Natural Environmental Areas	**Acres**	**Location**	**Land Use Plan**
Rockwell ONA/ACEC	9,630	Fillmore Field Office	House Range RMP
Devils Garden ONA	640	GSENM	GSENM MP
Escalante Canyons ONA	1,160	GSENM	GSENM MP
North Escalante Canyon ONA	5,800	GSENM	GSENM MP
Phipps-Death Hollow ONA	34,300	GSENM	GSENM MP
The Gulch ONA	3,430	GSENM	GSENM MP
Wolverine Petrified Wood Natural Environmental Area	1,520	GSENM	GSENM MP
No Mans Mesa RNA	1,335	GSENM	GSENM MP
Diana's Throne RNA	1,100	Kanab Field Office	Vermilion MFP
Kimball Butte RNA	160	Kanab Field Office	Vermilion MFP
Paria-Hackberry ONA	70,000	Kanab Field Office	Paria MFP
50 Mile Mountain ONA	100,000	Kanab Field Office	Paria MFP
Negro Bill Canyon ONA/ ACEC	1,375	Moab Field Office	Grand RMP
TOTAL	**230,450**		

National Monuments	Acres		Land Use Plan
Grand Staircase-Escalante	1,865,420		GSENM MP
National Natural Landmarks	**Acres**	**Location**	**Land Use Plan**
Little Rockies National Natural Landmark	32,640	Richfield Field Office	Henry Mountain MFP
Joshua Tree National Natural Landmark	1,040	St. George Field Office	St. George RMP
TOTAL	**33,680**		
National Scenic Byways	**Miles**	**Location**	**Land Use Plan**
Transcontinental Railroad National Back Country Byway	90	Salt Lake Field Office	Box Elder RMP
Silver Island Mountain Loop National Back Country Byway	54	Salt Lake Field Office	Box Elder RMP
Pony Express Trail National Back Country Byway	133	Salt Lake Field Office	Pony Express RMP
Trail of the Ancients State Scenic Byway	156 (approx)	Monticello Field Office	San Juan RMP
Joshua Tree Road Scenic Byway	13	St. George Field Office	St. George RMP
Bull Creek Pass Back Country Byway	68	Richfield Field Office	Henry Mountain MFP
TOTAL	**514 (approx)**		
Rivers Eligible and/or Suitable for National and Scenic River System	**Miles**	**Location**	**Land Use Plan**
Harris Wash: Suitable	1.1	GSENM	GSENM Management Plan
Lower Boulder Creek: Suitable	13.5	GSENM	GSENM Management Plan
Escalante River Segments 1, 2, 3: Suitable	34.1	GSENM	GSENM Management Plan
Slickrock Canyon: Suitable	2.8	GSENM	GSENM Management Plan
Lower Deer Creek Segments 1, 2: Suitable	10.8	GSENM	GSENM Management Plan
The Gulch Segments 1,	24.6	GSENM	GSENM Management

2, 3: Suitable			Plan
Steep Creek: Suitable	6.4	GSENM	GSENM Management Plan
Lower Sand Creek and Willow Patch Creek: Suitable	13.2	GSENM	GSENM Management Plan
Mamie Creek and West Tributary: Suitable	9.2	GSENM	GSENM Management Plan
Death Hollow Creek: Suitable	9.9	GSENM	GSENM Management Plan
Calf Creek Segments 1, 2, 3: Suitable	8.0	GSENM	GSENM Management Plan
Twenty-Five Mile Wash: Suitable	6.8	GSENM	GSENM Management Plan
Upper Paria River Segments 1, 2: Suitable	38.6	GSENM	GSENM Management Plan
Lower Paria River Segments 1, 2: Suitable	8.1	GSENM	GSENM Management Plan
Deer Creek Canyon: Suitable	5.2	GSENM	GSENM Management Plan
Snake Creek: Suitable	4.7	GSENM	GSENM Management Plan
Hogeye Creek: Suitable	6.3	GSENM	GSENM Management Plan
Kitchen Canyon: Suitable	1.3	GSENM	GSENM Management Plan
Starlight Canyon: Suitable	4.9	GSENM	GSENM Management Plan
Lower Sheep Creek: Suitable	1.5	GSENM	GSENM Management Plan
Hackberry Creek: Suitable	20.1	GSENM	GSENM Management Plan
Lower Cottonwood Creek: Suitable	2.9	GSENM	GSENM Management Plan
Buckskin Gulch: Suitable	18.0	GSENM	GSENM Management Plan
Colorado River from where public land begins south of the	13.5	Monticello Field Office	San Juan RMP

San Juan County line down river to the north boundary of Canyonlands National Park: Eligible			
San Juan River from the bridge on U.S. Highway 191 below Bluff to the Glen Canyon NRA boundary: Eligible	45.0	Monticello Field Office	San Juan RMP
White Canyon from the USFS boundary to the boundary of Glen Canyon NRA: Eligible	43.0	Monticello Field Office	San Juan RMP
Deep Creek/Crystal Creek: Suitable	11.4	St. George Field Office	St. George RMP
North Fork Virgin River: Suitable	0.7	St. George Field Office	St. George RMP
Kolob Creek/Oak Creek: Suitable	3.6	St. George Field Office	St. George RMP
La Verkin Creek/Smith Creek: Suitable	14.1	St. George Field Office	St. George RMP
Virgin River, Segment B (within the Beaver Dam Mountains Wilderness): Suitable	6.5	St. George Field Office	St. George RMP
TOTAL	**389.8**		
Congressional Designations			
National Conservation Areas	**Acres**	**Location**	
Colorado Canyons	5,120 acres	Moab Field Office boundary, managed by Grand Junction Field Office, Colorado	Colorado Canyons
National Historic Trails	**Miles**	**Location**	**Planning Region**
California	75	Salt Lake Field Office	Salt Lake
Pony Express	106	Salt Lake and Fillmore Field Offices	Salt Lake and Fillmore
Old Spanish Trail	325 (approx)	Richfield, Price, Moab, Monticello, Kanab, Cedar City and St. George Field Offices and GSENM	Grand Staircase-Escalante National Monument Plan, CBGA RMP, Dixie RMP, Grand RMP, Mountain Valley MFP, Paria MFP, Pinyon

			MFP, San Juan RMP, Vermilion MFP, Zion MFP
Hole-in-the-Rock Trail	133 (approx)	Grand Staircase-Escalante National Monument	Cedar City
TOTAL	**639 (approx)**		
Sources: BLM 1999, 2004b, 2004c, 2004d, 2004e, 2004f, 2004g, 2004i, 2004k, 2004l, 2004m, 2004n, 2004o, 2004p, 2004q, 2004r, 2004s, 2004t, 2004u; 2004 v, Mermejo 2004c; FHWA 2004.			

3.4.12.1 Congressional Designations

- National Conservation Areas (NCAS): Colorado Canyons NCA is the only NCA located within the planning area (**Table 3.14**).
- National Historic Trails: Four National Historic Trails occur within the planning area: the California National Historic Trail; Pony Express National Historic Trail; Old Spanish Trail; and Hole-in-the-Rock Trail (NPS 2004) (**Table 3.14**). An approximate total of 639 miles of these trails are located within the planning area.

3.4.12.2 Administrative Designations (Wilderness and WSAs)

Wilderness A total of 26,720 acres of designated Wilderness are administered by the BLM in Utah. Approximately 22,600 of these acres were designated Wilderness as part of the 1984 Wilderness Act for Arizona. This Act established Wilderness on approximately 20,000 acres in Paria Canyon within the Kanab Field Office (18 percent of the 109,400 acre, two state WSA designation) and approximately 2,600 acres in the Beaver Dam Mountains in the St. George Field Office (15 percent of the 17,600 acres, two-state WSA designation). The Colorado Wilderness Act of 1999 established the approximately 5,100 acres of the Black Ridge Canyons Wilderness on the Uncompahgre Plateau in the Moab Field Office (7 percent of the 75,439-acre, two-state WSA designation).

Wilderness Study Areas The U.S. Congress established a National Wilderness Preservation System for federal lands when it passed the Wilderness Act of 1964. In 1976, Section 603 of FLPMA directed the BLM to review its remaining roadless areas and make recommendations as to whether or not each area should become a congressionally designated Wilderness area. The basic criteria for Wilderness include size, naturalness and opportunities for solitude and/or primitive and unconfined recreation. Each of the designated WSAs are also be characterized by special qualities such as ecological, geological, educational, historical, scientific or scenic values.

There are approximately 2.6 million acres that have been designated for WSAs in each of the 21 land use planning areas. **Table 3.15** describes the attributes and size of the areas by field office. These areas have wilderness characteristics and are being considered by Congress for possible Wilderness designation. The BLM is required to maintain the wilderness character of each WSA until a final decision is made by Congress regarding inclusion in the National Wilderness Preservation System or until it is released from WSA status and made available for other uses. The general standard for this management is that the suitability of these lands for preservation as Wilderness must not be impaired. Should Wilderness designation occur in the future, Wilderness

management would be accomplished by Wilderness management plans framed and written to fit each individual designation area.

Table 3.15 Wilderness Study Areas on BLM-Administered Lands in Utah

WSA/ISA Name	WSA Number	Acres Recommended for Wilderness (approx)	Acres Recommended for Non-Wilderness (approx)
Salt Lake Field Office			
North Stansbury Mountains	UT-020-089	10,480	0
Cedar Mountains	UT-020-04	0	50,500
Deep Creek Mountains	UT-050-020/ UT-020-060	57,384	11,526
Richfield Field Office			
Mt. Ellen-Blue Hills	UT-050-238	65,804	15,922
Bull Mountain	UT-050-242	11,800	1,820
Dirty Devil	UT-050-236A	61,000	0
Horseshoe Canyon (South)	UT-050-237	36,000	2,800
French Spring-Happy Canyon	UT-050-236B	11,110	13,890
Fiddler Butte	UT-050-241	32,700	40,409
Mt. Pennell	UT-050-248	25,800	48,500
Mt. Hillers	UT-050-249	16,360	3,640
Little Rockies	UT-050-247	38,700	0
Fremont Gorge	UT-050-221 (202)	0	2,540
Fillmore Field Office			
Fish Springs	UT-050-127	33,840	18,660
Rockwell	UT-050-186	0	9,150
Swasey Mountain	UT-050-061	34,376	15,124
Howell Peak	UT-050-077	14,800	10,000
Conger Mountain	UT-050-035	0	20,400
Notch Peak	UT-050-078	28,000	23,130
King Top	UT-050-070	0	84,770
Wah Wah Mountains	UT-050-073/ UT-040-205	36,382	5,758
Moab Field Office			
Behind The Rocks	UT-060-140A	12,635	0
Mill Creek Canyon	UT-060-139A	9,780	0
Negro Bill Canyon	UT-060-138	7,620	0
Floy Canyon	UT-060-068B	23,140	49,465
Coal Canyon	UT-060-100C2	20,774	40,656
Spruce Canyon	UT-060-100C1	14,736	5,614
Flume Canyon	UT-060-100B	16,495	34,305
Westwater Canyon	UT-060-118	26,000	5,160

WSA/ISA Name	WSA Number	Acres Recommended for Wilderness (approx)	Acres Recommended for Non-Wilderness (approx)
Lost Spring Canyon	UT-060-131B (202)	3,880	0
WrigleyMesa/Jones Canyon/ Black Ridge Canyon West	UT-060-116/117 C0-070-113A	5,200	0
Links Flats NA	UT-ISA-008	0	912
Monticello Field Office			
Mancos Mesa	UT-060-181	51,440	0
Grand Gulch ISA Complex: Pine Canyon Bullet Canyon Sheiks Flat Stickhorn Canyon	UT-ISA-001 UT-060-188 UT-060-196 UT-060-224 UT-060-197/198	105,520	0
Road Canyon	UT-060-201	52,420	0
Fish Creek Canyon	UT-060-204	40,160	6,280
Mule Canyon	UT-060-205B	5,990	0
Cheesebox Canyon	UT-060-191	0	15,410
Dark Canyon ISA Complex:	UT-ISA-002 UT-060-175	68,030	0
Butler Wash	UT-060-169	24,190	0
Bridger Jack Mesa	UT-060-167	5,290	0
Indian Creek	UT-060-164	6,870	0
South Needles	UT-060-169A	160	0
Squaw/Papoose Canyon	UT-060-227/ C0-030-265A	0	6,676
Cross Canyon	UT-060-229/ C0-030-2265	0	1,008
Kanab Field Office			
North Fork Virgin River	UT-040-145 (202)	1,750	0
Orderville Canyon	UT-040-230	17,888	12,912
Parunuweap Canyon	UT-040-143	33,800	13,370
Moquith Mountain	UT-040-217	0	14,830
Cedar City Field Office			
Spring Creek Canyon	UT-040-148 (202)	1,607	2,826
White Rock Range	UT-040-216/ NV-04-202	3,820	0
St. George Field Office			
Cougar Canyon	UT-040-123/ NV-050-166	4,228	6,340
Red Mountain/Red Mountain 202	UT-040-132/132A	12,842	5,448
Cottonwood Canyon	UT-040-046	9,853	1,477
LaVerkin Creek Canyon	UT-040-153 (202)	567	0

WSA/ISA Name	WSA Number	Acres Recommended for Wilderness (approx)	Acres Recommended for Non-Wilderness (approx)
Deep Creek	UT-040-146 (202)	3,320	0
Canaan Mountain	UT-040-150 (202)	1,040	0
The Watchman	UT-040-149 (202)	600	0
Taylor Creek Canyon	UT-040-154 (202)	35	0
Goose Creek Canyon	UT-040-176 (202)	89	0
Beartrap Canyon	UT-040-177 (202)	40	0
Red Butte	UT-040-147 (202)	804	0
Joshua Tree NA	UT-ISA-010	0	1,040
Grand Staircase-Escalante National Monument			
The Blues	UT-040-268	0	19,030
Mud Spring Canyon	UT-040-077	0	38,075
Paria-Hackberry/Paria-Hackberry 202	UT-040-247/247A	95,042	41,180
The Cockscomb	UT-040-275	5,100	4,980
Wahweap	UT-040-248	0	134,400
Burning Hills	UT-040-079	0	61,550
Death Ridge	UT-040-078	0	62,870
Phipps-Death Hollow	UT-ISA-006	39,256	3,475
Steep Creek	UT-040-061	20,806	1,090
North Escalante Canyons/The Gulch	UT-040-076	91,558	28,194
Carcass Canyon	UT-040-082	0	46,711
Scorpion	UT-ISA-005	14,978	20,906
Escalante Canyons Tract 5	UT-040-080	760	0
Fiftymile Mountain	UT-ISA-009	91,361	54,782
Devils Garden NA	UT-ISA-003	0	640
Escalante Canyons Tract 1 NA	UT-040-076	0	360
TOTAL (2,586,521)		**1,466,010**	**1,120,511**

[1] ISA = Instant Study Area
NA = unit was originally a Natural Area Source: BLM 1990, Mermejo 2004a, 2004b

Areas of Critical Environmental Concern ACECs are unique to the BLM. Pursuant to the FLPMA, the BLM is mandated to designate and protect ACECs where special management attention is required to protect and prevent irreparable damage to important historic, cultural or scenic values; fish and wildlife resources or other natural systems or processes; or to protect life and safety from natural hazards. The restrictions associated with an ACEC designation are determined at the time the designation is made and are designed to protect the values or serve the purposes for which the designation was made. **Table 3.14** lists ACECs totaling 783,488 acres located on BLM-administered lands in Utah (BLM 2004i). The number of ACECs and/or ACEC acreages may change as RMPs are revised by BLM field offices in Utah.

3.4.12.3 Other Administrative Designations

- **Research Natural Areas (RNAs)** Multiple RNAs are found within the planning area, as shown in **Table 3.14**.
- **Outstanding Natural Areas (ONAS)** Multiple ONAs are found within the planning area, as shown in **Table 3.14**. Two of the ONAs, Rockwell and Negro Bill Canyon, are also ACECs.
- **Natural Environmental Areas** One National Environmental Area, Wolverine Petrified Wood, is located within the planning area (**Table 3.14**).
- **National Monuments** Grand Staircase-Escalante National Monument is the only national monument located within the planning area (**Table 3.14**).
- **National Natural Landmarks** National Natural Landmarks are of national importance because they represent one of the best known examples of a region's natural biotic or geological features. Three National Natural Landmarks are found within the planning area: Cleveland-Lloyd Dinosaur Quarry, Little Rockies and Joshua Tree (**Table 3.14**). The Cleveland-Lloyd Dinosaur Quarry National Natural Landmark, managed by the Price Field Office, houses Jurassic-age dinosaur bones. The Little Rockies National Natural Landmark is managed by the Richfield Field Office and encompasses 32,640 acres. Joshua Tree National Natural Landmark is managed by the St. George Field Office and includes the northernmost stand of Joshua trees and the Joshua Tree Road Scenic Backway.
- **National Scenic Byways** The National Scenic Byways Program is part of the Federal Highway Administration's Department of Transportation and was established to help recognize, preserve and enhance selected roads throughout the United States. Roads in the program are recognized as All-American Roads or Back Country Byways based on one or more archaeological, cultural, historic, natural, recreational and/or scenic qualities. Back Country Byways, which include National Scenic Byways and Backways, are the BLM's unique contribution to the nation's byway program and combine motor vehicles, hiking and biking in the outdoors. Each Back Country Byway provides the public with recreational opportunities while informing them about natural and cultural resources and multiple use activities on public lands. The byways managed by the BLM in Utah are listed in **Table 3.14**.
- **Wild and Scenic Rivers** No rivers in Utah have been designated by Congress into the National Wild and Scenic Rivers System. However, Section 5(d) (1) of the Wild and Scenic Rivers Act directs federal agencies to consider potential wild and scenic rivers in their land and water planning processes. In the five BLM RMPs in Utah where wild and scenic river considerations have been made, 35 rivers or river segments are eligible for listing in the National Wild and Scenic Rivers System (**Table 3.14**). Twenty-nine of these are suitable for listing; therefore, these rivers are managed by the BLM as if they were Wild and Scenic. Suitability studies have not yet been completed on the remaining six. Rivers or river segments determined to be eligible are managed to protect free flow, outstandingly remarkable values and tentative classification. This protective management is in place until the river or river segment is determined, during the study phase, to be suitable or unsuitable. Similarly, suitable segments are managed to protect the free flow,

outstandingly remarkable values and recommended classification until Congressional action regarding designation is taken (BLM 2004l).

3.4.13 Socioeconomics

Utah represents the Region of Influence (ROI) for social and economic activities pertaining to this statewide LUP EA. The ROI is defined as the geographical area in which the principal direct and indirect socio-economic effects of the Proposed Action or Alternatives would likely occur. The purpose of documenting the socio-economic setting of the ROI is to provide an understanding of the social and economic forces that have shaped the area and to provide a frame of reference necessary to determine the degree of estimated economic effects of the Proposed Action and Alternatives.

Baseline data for the Utah ROI includes population and demographic data, as well as current business and economic statistical information for the state. Information was obtained from the Bureau of Labor Statistics, Bureau of the Census and based on census data from the year 2000. Additional data was derived from the Sonoran Institute's Population, Employment, Earnings and Personal Income Trends database.

Population Utah had a total population of 2,233,169 in the year 2000. A comparison of 1990 and 2000 population data exhibits a 3.0 percent per year growth rate compared to the national growth rate of 1.31 percent per year. According to the U.S. Census Bureau and Utah population data, the population of Utah will increase by 32.9 percent from 2000 to 2020. This represents an annual population increase of 1.6 percent per year compared to a growth rate of less than 1 percent per year for the nation.

During the 2000 census, 89.2 percent of residents of Utah reported their ethnic heritage as Caucasian, of this 89.2 percent, 9 percent reported Hispanic or Latino origin. The same census shows 1.7 percent of Utah's residents as Asian, 1.3 percent as American Indian and Alaska Native, 0.8 percent as Black or African American, 0.7 percent as Native Hawaiian or other Pacific Islander and 4.2 percent as "other" (2.1 percent of Utah's residents reported two or more races).

Employment Utah supported 1,394,198 full- and part-time jobs in 2000, an increase of 939,585 jobs since 1970 (an annual average increase of 10.3 percent, more than three times the population growth rate in the ROI during the same time frame).

The job mix for Utah has changed dramatically since 1970. The mining and farm and agricultural services sectors have decreased their shares of total employment, while all other sectors have marginally or substantially increased. The services and professional sector has experienced a major increase in the number of jobs (over 73 percent in 30 years). Major growth components of this sector include retail trade and finance and insurance and real estate (growth rates of 17.4 percent and 11.1 percent, respectively).

Unemployment rates in Utah for the years 2000 to 2003 were below the national level, averaging 3.3 percent in 2000 and 5.6 percent in 2003. National rates were 4.4 percent in 2000 and 6.1 percent in 2003.

Median household income is commonly used to understand the relationship of regional income trends within an ROI, without regard to personal income. Utah had a median household income less than the national average in both 1990 and 2000. The Utah growth rate closely followed the national rate of 46.8 percent.

Wildland Urban Interface Wildland-urban interface communities are defined as areas where humans and their development meet or intermix with wildland fuels. Due to the high risk to human health and safety, personal and community property, as well as the high costs associated with suppressing fires in these areas, WUI areas have been identified as high-priority areas for hazard and risk reduction activities.

The operational role of federal agencies in WUI areas has been defined as wildland firefighting, hazard fuels reduction, cooperative prevention and education and technical assistance (Wildland Fire Leadership Council 2003). Although primary responsibility for protecting private property and rural communities lies with individual property owners and local governments, the National Fire Plan, adopted in 2000, clearly focuses federal efforts in assisting in WUI areas. The Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy suggests that federal objectives and management intent in WUI areas include funding community programs such as FIREWISE, preventing the movement of wildfire into or out of WUI areas, improving wildfire suppression in WUI areas, assisting responsible jurisdictions in protection efforts, clarifying and reconciling jurisdictional inter-relationships and protection responsibilities through the development of a protection authorities matrix (Wildland Fire Leadership Council 2003).

In 2001, the BLM completed, in an interagency effort, a statewide fire assessment project (BLM 2001). The project involved defining and ranking hazards and risks (such as fire density and population density values) and mapping statewide. These maps were developed to assist agency personnel in responding to resource needs and land management issues, as well to communicate to the public the hazards and risks to WUI areas presented by fire. In an effort to reduce excessive or unnecessary paperwork, the Utah Statewide Fire Assessment Project and associated fire risk assessment maps, are incorporated by reference into this document (BLM 2001).

Also in 2001, the U.S. Department of the Interior and USDA issued a notice with a list of WUI communities within the vicinity of federal lands that were determined to be at high risk from wildfire (DOI 2001). Within Utah, over 400 communities were classified as "at risk" to wildfire. A list of these communities is presented in **Appendix H** (DOI 2001).

To address the risks associated with WUI areas, numerous federal, Tribal, state and local programs and initiatives have been implemented to address hazards posed to these areas. In particular, public outreach and education have been identified as critical to reducing WUI hazards. The Utah Division of Forestry, Fire and State Lands has developed a Community Fire Plan and Guidance Document to assist with community planning and WUI fire prevention (UDNR 2002). It is currently the primary state agency coordinating state and local efforts to increase public awareness, facilitate citizen fire counsels and provide community fire prevention and safety training.